

DESIGN PROBES FOR HAPPINESS

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Title of thesis Design probes for Happiness		
Department Design		
Degree programme Masters in International Design Business Management		
Year 2014	Number of pages 91	Language English

Abstract

This thesis explores the potential use of design probes for capturing the essence of users' happiness by understanding their dreams, needs and emotions. Since the realization of the significance of happiness in design, designers are often encouraged to position positive emotions as the starting point for developing new product/service concepts. In order to gain a holistic understanding of the user and the environment of use, extracting these emotions and their contexts from the users can be a vital step in product development process. Design probes are an approach of user-centered design for understanding human phenomena and exploring design opportunities. The thesis specifically explores the potential use of design probes for extracting positive emotions from users which serve as a source of inspiration for the designers for developing new products and services.

The relationship between the key components of this thesis: happiness, design and design probes was established at the onset of this thesis through literature review. The retrospective analysis of the case studies found in the literature helped in determining different elements for designing probes for happiness in terms of materials of the probe kit, their functions and key user insights gained from such probing process. An experimental study with coffee as the focus product facilitated the testing of these probes for happiness. It also helped in simulating the design process that of a design team interested in exploring design opportunities for bringing happiness to the users. Overall, the results and findings of this experimental study demonstrate that design probes can be used for gaining holistic understanding about the happiness of the users. In addition, the study helps in proposing a set of guidelines of essential elements to be considered while designing probes specific to capturing happiness related information from the users. The thesis is of value for designers because it can facilitate their design process to build products or services that stimulate positive emotions in users.

Keywords: design probes, happiness, design, user-centered design, product emotions, coffee

ACKNOWLEDGMENTS

I would like to thank first and foremost my family for their help and support at all times.

I would like to thank my supervisor Oscar Person for his constant guidance and advice throughout the research. I would also like to convey my gratitude to Peter McGrory and Naoko Nakagawa for giving valuable inputs during the thesis seminars.

Special thanks go to the user study participants for taking part in the research and sharing experiences about their lives. I would also like to thank the Design Factory at Aalto University for the resources and space required during the user study and workshops.

I would also like to extend my warmest thanks to Abir Iqbal, Faraz Ahmed Khan and Tatyana Chuzhanova for their unfailing encouragement and help at different stages during the research. I thank all my dear friends who, though not a part of this project, have been a source of support and strength all through.

Finally, I want to dedicate this thesis to all readers who are interested in designing and exploring new ways to introduce and enhance happiness in this world.

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1

INTRODUCTION

This chapter serves the purpose of setting up the context of this research. It sets out the background about the recent trend of happiness in design and the challenge faced by designers in this context. This leads to defining the aim of this research to explore the potential of Design Probes as a tool for extracting design relevant information about the user's happiness. In addition, the chapter also introduces the steps for testing this potential in order to further present a set of guidelines for designing probes for happiness. This chapter also defines the two research questions and gives an overview of the structure in which the research will be carried out.

1.1 Happiness and Design

When products and services are designed with an aim to make people happy, it becomes essential to first understand what makes the users happy. The main challenge for designing happiness into products is to grasp the user's affective needs accurately and then to design products that match these needs. In this thesis, I explore the potential of design probes as a tool for extracting design relevant information about the user's happiness. Design Probes are specifically designed material packages given to the potential users to document their private lives, contexts and experiences. This data can then serve as a source of inspiration for the designers for developing new products and services that aim toward bringing happiness to the user.

Happiness is one of most important and desirable emotions in people. As described by psychologist Ed Diener (2011), the author of *Happiness: Unlocking the Mysteries of Psychological Wealth*, happiness is a combination of life satisfaction and having more positive emotions than negative emotions. According to Lyubormisky, King and Diener (2005) happiness is the frequent experience of positive emotions over time. In other words, happiness is about thinking and feeling positively about one's life. They illustrate that happy people are more creative, productive and social. They present a conceptual model that demonstrates how happiness is the key ingredient to success of human beings. Their conceptual model argues that happy individuals are successful across multiple life domains, including marriage, friendship, income, work performance, and health. The characteristics related to positive affect include confidence,

optimism, and self-efficacy; likability and positive construal of others; sociability, activity, and energy; prosocial behavior; immunity and physical well-being; effective coping with challenge and stress; and originality and flexibility (Lyubormisky, King and Diener. 2005).

Happiness research has produced a large amount of literature and conclusions with its widely recognized importance in design (Desmet, 2012; Desmet and Schifferstein, 2012; Ruitenberg and Desmet, 2012; van de Poel, 2012). This focus on design for happiness is a recent phenomenon which has led to exciting and challenging opportunities for designers. Sääksjärvi and Hellén (2013) explain design for happiness as designing business concepts, i.e., products and/or services, with the aim to build and support long-term happiness of consumers. Demirbilek and Sener (2003) suggest that positive emotions like happiness not only stimulate product purchase intentions but also develop long term attachment with the product. In addition to functionality and usability, the ability of a product to evoke and sustain emotions from the user is essential in defining the overall user experience. They give examples of design companies like Frog Design, Alessi and Swatch who are trying to differentiate their products in the competitive market by employing emotions like happiness in their design and marketing strategies. These factors encourage the designers, in a manner that their efforts are not only aimed towards developing the physical aspects of a product but also towards understanding and embedding positive emotions in it.

Consumers don't want to be "satisfied," —they want to be happy. Your product's long-term success depends on loftier goals and a broader array of design strategies that deliver emotional and social results for your customers (Norton, Durgee and VanDeVelde, 2010).

Since focus on happiness in design is a recent phenomenon, its practical implementation in terms of user experience is still in an early research stage. New approaches to integrate happiness in products and services are being discussed in the design community (Boatwright and Cagan, 2010; Chitturi et al., 2008; Helander and Khalid, 2006). The main challenge for designing happiness into products is to grasp the user's affective needs accurately and then to design products that match these needs (Jiao, Zhang and Helander, 2006). To do so, designers need to find answers to questions such as: what makes the users happy? How can we deliberately make products that can make the users happier? To design best possible solutions for the users, designers need insight in the user's life and the situations that influence and enhance the user-product interaction. A number of techniques have emerged to explore the user's emotions, experiences, contexts and environments of product use (Nagamachi, 2002; Desmet, 2002; Desmet, 2012; Gaver, 2001; Mattelmäki, 2006; Sanders, 2000; Stappers and Sanders, 2003; Vaajakallio, 2012). The literature has documented assessment and development of creative tools for finding new means of understanding the emotional

aspects of product design. (Jordan, 2000; Green and Jordan, 2003 and Desmet, 2002)

When aiming to design a product that evokes a particular positive emotion, the designer can look beyond the object and explore opportunities to design for particular human-product interactions or for activities or human-human interactions that are facilitated or stimulated by the product (Desmet, 2012). Although an extensive literature is available on creative techniques for extracting user emotions, most of them focus on understanding the entire range of emotions and are not specifically targeted towards capturing happiness related responses. Also, the process of extracting specific positive emotions from users and applying them as practical design insights is still ambiguous.

This thesis explores the potential of design probes as a tool to understand the positive emotions of users which can serve as a source of inspiration for the designers for developing new products and services. In my opinion, if the primary aim of designers is to understand what makes a user happy then the tools used for such research can be more effective if they largely focus on capturing the positive emotions from the users. This way, the data gathered is centered on the more relevant positive emotions while also bearing the significance of remaining range of emotions. If the designer can understand what influences the positive feelings, they can make structured efforts towards inducing those feelings in the products as well as the services around the products.

1.2 Aim:

The aim of this research is to explore the potential of design probes for capturing information related to user's happiness.

This exploration will lead to presenting a set of design guidelines that –

1. underline the important elements that should be considered while designing probes for capturing happiness related information from users.
2. provide further insight in improving the current probing techniques to more effectively deal with the positive emotions of users.

This will be achieved through the attainment of the following steps:

1. To develop a foundation of theories which will guide the research by reviewing the literature of previous research in the following subjects:

- Happiness

- Understanding the range of emotions in products

- Implications of emotions in product design

- Measuring emotions

- Role of design probes

2. To conduct retrospective analysis of case studies for understanding and mapping design probes and their characteristics
3. To apply the identified characteristics for creating a set of design probes for a user study
4. To test the practical application of the design probes developed in Step3 by conducting a user study with a certain product focus
5. To simulate how the data collected from the user study can be used by a design team in a company, for creating products and services that embody happiness, by conducting a workshop with designers.
6. To utilize the findings from the workshop for developing set of guidelines for designing probes that capture positive emotions

1.3 Research questions

In order to study the potential of design probes as a tool to capture positive emotions from users I divided the research into two questions:

- 1 How can design probes help in capturing happiness related data from the users? Does this probing process generate enough design-relevant data that can be utilized for ideation or concept development of products or services that are aimed towards bringing happiness to the users?
- 2 What are the essential elements that should be considered while designing probes that are specifically targeted towards capturing happiness related data during a user study?

1.4 Thesis Structure

This thesis is composed of six chapters:

CHAPTER 1 – INTRODUCTION

This chapter serves the purpose of setting up the context of this research. It sets out the background about the recent trend of happiness in design and the challenge faced by designers in this context. This leads to defining the aim of this research to explore the potential of Design Probes as a tool for extracting design relevant information about the user's happiness. In addition, the chapter also introduces the steps for testing this potential in order to further present a set of guidelines for designing probes for happiness. This chapter also defines the two research questions and gives an overview of the structure in which the research will be carried out.

CHAPTER 2 – LITERATURE REVIEW

This chapter explores the literature surrounding the research project. The first section discusses the theories behind happiness and defines its scope for this research. The second section gives an overview of the range of emotions and their characteristics that define the user experience. It also describes the strong relationship between emotions, product design and consumption behavior. The third section outlines various measurement methods employed to capture emotional responses from the users. This leads to the last section where the role of design probes to capture design relevant information is discussed.

CHAPTER 3- RETROSPECTIVE ANALYSIS OF CASE STUDIES

This chapter shows a retrospective analysis of 9 different case studies found in the literature with a view to understanding how design probes can be applied in different contexts. This chapter presents the typical items that comprised the probe kit in the case studies, the function of these probes and the insights that designers gained through the probing process in each case. The findings from this retrospective analysis define the basis of the design process of probes for happiness in Chapter 4.

CHAPTER 4 – METHODS

The fourth chapter discusses methods of data collection and analysis used in the research. First it establishes the background of the experimental study with coffee as the focus product. The chapter then describes the step by step process of probing for happiness. The design process of 5 tasks that comprise the probe kit for happiness is explained in detail. It further presents the planning and development of a workshop to simulate the design process in the company. It shows how a design team in a company analyzes and interprets the data from the probing process and eventually utilizes the data to explore different design opportunities to make the participants happy.

CHAPTER 5 – RESULTS

This chapter summarizes the results of the experimental study that emerged during the workshop with the designers. The chapter presents the ratings of data in terms of insights gained by the designers. It also discusses the common themes related to coffee and happiness as well as the most recurring positive emotions evoked by the participants. In addition the chapter presents the results of the Application Test which helped in simulating the ideation process of that of a design team in a company where the data from the probes would be used to look for design opportunities.

CHAPTER 6 – ANALYSIS

This chapter presents the qualitative analysis of the results of the experimental study and the design simulation workshop. The chapter explores the research questions by analyzing the data from the probing process for

1. User insights like Inspiration, Exploration, Empathy, Direct Data and Framework : These insights help in addressing if the probes for happiness produced design relevant data for understanding happiness of the participants.
2. Nature, scope and medium of data : These elements help in addressing the grounds to defining the guidelines for designing probes for happiness

CHAPTER 7 - CONCLUSIONS

This chapter brings together all the previous chapters which comprise this research project thesis. This is achieved through demonstrating how the research aim and objectives were met through literature review and experimental study and design simulation workshop. This chapter concludes the research work by answering to the research questions by 1. highlighting how the structured efforts in instilling positive emotions throughout the probing process for happiness helps in capturing happiness related information from the participants. 2. presenting the guidelines for designing Probes for Happiness in terms of designing the materials of the probe kit and the content of the materials. In addition, the contribution to knowledge given by this research and recommendations for future work are discussed.

2

LITERATURE REVIEW

This chapter explores the literature surrounding the research project. The first section discusses the theories behind happiness and defines its scope for this research. The second section gives an overview of the range of emotions and their characteristics that define the user experience. It also describes the strong relationship between emotions, product design and consumption behavior. The third section outlines various measurement methods employed to capture emotional responses from the users. This leads to the last section where the role of design probes to capture design relevant information is discussed.

Happiness is a complex phenomenon. It was therefore necessary to understand the broad spectrum of literature and narrow it down to clearly define the scope of the word “happiness” with respect to this research. The need to understand happiness in terms of products gave further direction to the research. First it led to the identification of different emotions that constitute happiness and their relationship with products. Secondly, it led to the direction of understanding the relationship between emotions, product design and consumption behavior. The role that emotions play while designing products came up as a key phenomena to look at as well. The key challenge was to understand how emotions have been measured in order to use the information in the design process. Initially the different techniques that measure emotions of users were mapped. However, since emotions vary with contexts, situations and experiences, it was vital to explore the tools and techniques that assist in measuring emotions as well as their contexts. This established the need of creative tools like Design Probes. Thus, the role of Design Probes in capturing the dreams, needs and expectations of the users was explored in detail and the different characteristics of design probes and the probing process were studied. The novelty of application of probes for happiness posed opportunities and difficulties at the same time during development of the guidelines for ‘Probes for Happiness’. On one hand was the daunting situation of finding relevant literature, methodologies and case studies while on the other hand was the opportunity to explore exciting new grounds. The following sections discuss the different literature that formed the foundation of this research.

2.1 Happiness

This section investigates how happiness is perceived in terms of day-to-day life, spirituality and psychology. This wide spectrum of perceptions helps in understanding happiness from different point of views before formulating a clear definition of happiness for the scope of this research.

The Merriam-Webster’s Online Dictionary, defines happiness as:

- a state of well-being and contentment
- a pleasurable or satisfying experience

In other instances, some of the most famous quotes about happiness mentioned below show that happiness is very subjective and everyone perceives it in their own ways.

Happiness is the meaning and the purpose of life, the whole aim and end of human existence.

- Aristotle

Happiness is not a station you arrive at, but a manner of traveling.

- Margaret Lee Runbeck

Happiness is the spiritual experience of living every minute with love, grace and gratitude.

– Denis Waitley

Happiness is something that you are and it comes from the way you think.

- Wayne Dyer

One of the leading researchers in positive psychology, Seligman (2002), describes happiness as having three parts: pleasure, engagement, and meaning. In his book Authentic Happiness, he explains - pleasure as the “feel good” part of happiness, engagement as living a “good life” of work, family, friends, and hobbies, and meaning as using our strengths to serve a bigger purpose. According to the author, all three

are important, but when it comes to living a happy life it is the engagement and meaning that matter the most to people.

In her book, *The How of Happiness: A Scientific Approach to Getting the Life You Want*, Lyubomirsky (2007) discusses that happy people tend to perceive and interpret the world in ways that reinforce their happiness. According to Lyubomirsky, happy people respond to situations in a more positive and adaptive way and tend to make the fullest of the available cognitive resources. On the other hand, unhappy people tend to dwell on negative or ambiguous events, draining cognitive resources and creating negative consequences. This affects their perception to look at different things and they respond to situations in a negative manner.

In his TED talk, Psychologist Daniel Kahneman distinguish happiness in two ways as

1. the “experiencing self” - self who lives in context - which is the moment by moment feeling of happiness produced by positive emotions.
2. the “remembering self” - self that defines the context in which we will live from snapshots of significant- which is how we describe our lives when we think about it.

An excerpt from Kahneman’s talk elaborates more on the two selves -

“There is an experiencing self, who lives in the present and knows the present, is capable of re-living the past, but basically it has only the present. It’s the experiencing self that the doctor approaches — you know, when the doctor asks, “Does it hurt now when I touch you here?” And then there is a remembering self, and the remembering self is the one that keeps score, and maintains

the story of our life, and it’s the one that the doctor approaches in asking the question, “How have you been feeling lately?” or “How was your trip to Albania?” or something like that. Those are two very different entities, the experiencing self and the remembering self and getting confused between them is part of the mess of the notion of happiness.. ”

Kahneman establishes that in order to study about an individual's happiness, it is essential study both the selves to better understand how daily experiences add up to a happy life.

In order to understand what happiness means to people, researchers gather data on happiness by asking them to report their experiences. For example, the Oxford happiness Questionnaire and Subjective Happiness Scale facilitate these data gathering, where scientists design studies to accumulate information on happiness by asking people to reflect on their overall happiness levels (Hills and Argyle, 2002; Lyubomirsky and Lepper, 1999). This suggests that in order to gain an understanding about people’s happiness, it is essential to consider happiness as a long-lasting experience.

All of the above definitions and literature leads towards defining for the scope of happiness for this research where I distinguish happiness the concept from the emotion happiness. In other words I identify happiness, not as a momentary emotional state, but as a long-lasting phenomenon which is a combination of emotions as well as the experiences triggering those emotions.

2.2 Understanding happiness in products - The range of emotions:

After setting the background for happiness in the previous section, this section sheds light on the different emotions that constitute happiness. This section helps in developing a relationship between the emotions, products and the manner in which these two affect the user behavior.

Products can evoke a wide range of emotions, both negative and positive (Desmet, 2012). The fundamental difference between the two is- whereas negative emotions stimulate individuals to reject (or withdraw from) the object of their emotion, positive emotions stimulate individuals to accept (or approach) the object (Frijda, Kuipers, and Schure, 1989).

Fredrickson's (1998, 2001) broaden-and-build theory of positive emotions holds that positive emotions broaden people's momentary thought-action repertoires and lead to actions that build enduring personal resources. Joy, creates the urge to play, push the limits, and be creative—urges evident not only in social and physical behavior, but also in intellectual and artistic behavior. Interest, creates the urge to explore, take in new information and experiences, and expand the self in the process. Contentment creates the urge to sit back and savor current life circumstances, and to integrate these circumstances into new views of self and of the world. And love—which we view as an amalgam of distinct positive emotions (e.g., joy, interest, and contentment) experienced within contexts of safe, close relationships—creates recurring cycles of urges to play with, explore, and savor loved ones (Fredrickson and Cohn, 2008).

In his research, Desmet (2012) investigates the 25 positive emotions that can be experienced in user-product interaction, and explores the conditions under which people might experience these emotions in relation

to products. He introduces the following 6 basic sources of positive emotions and 25 positive emotion types in user-product interactions-

1. emotions evoked by the object
2. the meaning of the object
3. the interaction with the object
4. the activity that is facilitated by this interaction
5. ourselves
6. by others involved in the interaction

The 25 positive emotion types can be classified in nine categories: Enjoyment, Gratification, Empathy, Affection, Interest, Aspiration, Optimism, Assurance, and Animation. The general topology of these emotions is listed in Figure 1. According to Desmet, understanding these positive emotions is important in design processes as they can reflect different effects on behavior.

He proposes that these positive emotions should be used as a source of inspiration and a means for communication in design practice and education. This implies that, in order to shape an envisioned meaningful user-product relationship, the designer requires a holistic design approach. This relationship is instrumental in stimulating hope, pride, inspiration, amusement, admiration, or any of the other 20 positive emotions in the users. The diversity within the set offers an opportunity to formulate an “emotional fingerprint” for a brand, service, or product, which specifies the intended emotional response of users or consumers. Such an emotional fingerprint can help to improve the emotional consistency of a design (Desmet, 2012).

Desmet (2012) suggests that products that evoke positive emotions are bought more often, used more often, and are more pleasurable to use. Thus according to him, it is indisputably worthwhile to design products that evoke positive emotions – products that make users feel good.

empathy	sympathy To experience an urge to identify with someone's feelings of misfortune or distress <i>compassion / empathy / pity</i>	optimism	hope To experience the belief that something good or wished for can possibly happen <i>optimistic / encouraged / wishful</i>
	kindness To experience a tendency to protect or contribute to the well-being of someone <i>caring / friendly / tenderness / warm</i>		anticipation To eagerly await an anticipated desirable event that is expected to happen <i>eager / expectant</i>
	respect To experience a tendency to regard someone as worthy, good or valuable <i>appreciation / approval</i>		surprise To be pleased by something that happened suddenly, and was unexpected or unusual <i>amazement / astonished / startled / dazzled</i>
	love To experience an urge to be affectionate and care for someone <i>affection / intimacy / romance / infatuation</i>		energized To enjoy a high-spirited state of being energized or vitalized <i>exuberant / zest / excitement / stimulation</i>
affection	admiration To experience an urge to prize and estimate someone for their worth or achievement <i>impressed / esteem</i>	assurance	courage To experience mental or moral strength to persevere and withstand danger or difficulties <i>brave / heartened</i>
	dreaminess To enjoy a calm state of introspection and thoughtfulness <i>pensive / contemplative</i>		pride To experience an enjoyable sense of self-worth or achievement <i>triumphant / self-satisfaction / smug</i>
	lust To experience a sexual appeal or appetite <i>passion / sensual / horny / sexy</i>		confidence To experience faith in oneself or one's abilities to achieve or to act right <i>assurance / secure / trust</i>
	desire To experience a strong attraction to enjoy or own something <i>attraction / yearn / crave</i>		inspiration To experience a sudden and overwhelming feeling of creative impulse <i>enthusiasm / determination / challenged / zeal</i>
aspiration	worship To experience an urge to idolize, honour, and be devoted to someone <i>adore / devotion / reverence</i>	interest	enchantment To be captivated by something that is experienced as delightful or extraordinary <i>awe / charmed / moved / touched</i>
	euphoria To be carried away by an overwhelming experience of intense joy <i>ecstasy / elation / exhilaration / jubilation</i>		fascination To experience an urge to explore, investigate, or to understand something <i>curious / attentive / interest / engrossed</i>
	joy To be pleased about (or taking pleasure in) something or some desirable event <i>happy / pleasure / delight / cheerful</i>		relief To enjoy the recent removal of stress or discomfort <i>reassured / soothed / gratitude</i>
	amusement To enjoy a playful state of humour or entertainment <i>entertained / gaiety / humorous / glee</i>		relaxation To enjoy a calm state of being free from mental or physical tension or concern <i>comfortable / carefree / serene / tranquility</i>
enjoyment		gratification	satisfaction To enjoy the recent fulfillment of a need or desire <i>gratified / pleased / contentment / fulfillment</i>

Figure 1: 25 Positive emotions by Desmet

2.3 Implication of emotions in product design

This section puts forth different theories and models to shed light on the relationship between different emotions and products. It also sets the notion of why it is important to design products that elicit different emotions.

Emotion is a fundamental and pervasive aspect of everyone's life. Emotions guide, enrich and ennoble life; they provide meaning to everyday existence; they render the valuation placed on life and property. (Cacioppo et al., 2001). There have been a number of significant contributions to understanding how emotions influence the way a customer reacts with products. In their book *Built to love*, Boatwright and Cagan (2010) suggest that emotion fuels the satisfaction people feel when using a product and strengthens their desire to repurchase that product. It is emotion that instigates people to tell others about the products they own. It affects how we feel, how we behave and think and it has gained significant attention in interaction design (Khalid and Helander, 2006).

Rafaeli and Vilnai-Yavetz (2004) provide a model for analyses of products and for understanding how they impact emotions. They provide valuable insights on how emotions are vital in 'sensemaking' by impacting how users interpret, explore and appraise a product. They characterize this sensemaking by three dimensions – instrumentality, aesthetics and symbolism. Instrumentality refers to the extent to which the product contributes to achieving goals or task performance. Aesthetics is the sensory experience that the product ignites, and the extent to which this experience fits individual goals and spirit. Symbolism which refers to the meanings or associations the product represents.

Yalch (1996) compares users' requirements of products to Maslow's hierarchy of needs. He suggests that once the utilitarian needs like safety and comfort have been satisfied, users are likely to shift towards the aesthetic,

emotional and symbolic attributes of design. Thus, a product's perceived value may be of greater importance than its physical characteristics. According to Dormann (2001) the traditional utilitarian view in particular seems inappropriate for products whose selections and uses are based upon satisfying emotional want rather than fulfilling utilitarian functions. Emotional desire can dominate utilitarian motives in the choice of products.

Boatwright and Cagan (2010) suggest that a product itself must be designed from the start to evoke emotions that resonate deeply with the customer, resulting in passion in the marketplace and customer commitment to the company.

This is due to the fact that when users purchase and use products they primarily seek two aspects - the product must perform or function at a level that meets their task needs and that the product must satisfy the user's emotional needs and wants. Chitturi (2009) establishes that both positive and negative emotions impact customer loyalty. Therefore, it is important for the designers to understand the relationship between the benefits they design into a product and the nature of the consumption experience as determined by its emotional content (Chitturi et al., 2008). After all, one of the main objectives of designers is to offer a unique experience to consumers to motivate them to indulge in positive word-of-mouth and improve the likelihood of repurchasing the product. (Chitturi, 2009).

Building emotional aspect into products is becoming increasingly predominant within the world of product design. As a result, designers are often challenged to manipulate the emotional impact of their designs. Desmet, Hekkert, and Hillen (2004) discuss that although emotional responses are difficult to predict since different people can respond in a variety of ways to the same design, universal patterns can be identified in the underlying process of how these

emotions are evoked. According to them, emotional responses are the outcome of an appraisal process in which the product is associated with underlying human concerns. To facilitate the study of relationships between products and emotions, Desmet and Hekkert (2002) propose the model of product emotions. The model consists of four elements describing the process of an emotion: (1) appraisal, (2), concern, (3) product, and (4) emotion. The model represents how appraisal, concern and product interplay to determine if a product elicits an emotion and which emotion is evoked. Hence, appraisal represents the way how the user perceives the product. A pleasant emotion is aroused by the user, when the product is perceived beneficial. If a product is appraised as beneficial, this means it matches the user's concerns.

Based on this model, the authors further classify emotional responses evoked by products in five types: instrumental, aesthetic, social, surprise and interest. Instrumental emotions like satisfaction or disappointment result from products that help the users from accomplishing certain goals. Aesthetic emotions like attraction or disgust emerge from perceivable characteristics that can appeal or offend the users' senses. Social emotions like admiration and indignation arise from the association of products with social standards and norms. Pleasant and unpleasant surprise emotions relate to the novel aspect of the products and are considered as one-time-only emotions. Interest emotions like fascination, boredom and inspiration are elicited by the combination of challenge and promise.

2.4 Measuring emotions

Following the increasing importance of the role of emotion in product design, it becomes important to understand how to actually measure these emotions in order to use them in the design process. This section talks about different measurement techniques that have been used to capture emotional responses from users.

Desmet (2005) suggests that an instrument that enables us to measure emotional responses can support the study and exploration of relationships between subjective affective responses, and objective interaction and design characteristics. Given this application purpose, the instrument should be able to measure subtle (i.e. low intensity) emotions, and mixed emotions. He further states that in order to build a measurement method, one needs to characterize and classify emotions at the onset. He categorizes the emotion measurement instruments in two groups-

(1) Non-verbal measurement instruments- that measure either the expressive or the physiological component of emotion. These consist of facial, vocal, and postural expression that accompanies the emotion.

(2) Verbal measurement instruments. - which assess the subjective feeling component of emotions typically through self-report.

While non-verbal instruments can be useful cross-culturally, verbal instruments have the benefit of measuring distinct emotions. Combining the advantages of both non-verbal and verbal measurement instruments, Desmet (2003) introduces Product Emotion Measurement Instrument (PrEmo) as a self-report instrument to assess emotional responses elicited by consumer products. The core idea of PrEmo lies in the universal nature of emotional expressions (facial and bodily) across cultures. In this method the user selects one animated cartoon character to describe 14 distinct emotions - seven pleasant emotions (i.e. desire, pleasant, surprise, inspiration, amusement, admiration, satisfaction, fascination) and

seven unpleasant emotions (i.e. indignation, contempt, disgust, unpleasant surprise, dissatisfaction, disappointment, and boredom).

Other authors, Khalid and Helander (2006), who have contributed to the knowledge of measuring emotions, argue that in order to capture various dimensions of emotion a combination of subjective and objective measures is required. They suggest five criteria to measure and evaluate emotions – dynamics, context, reliability, validity and measurement error. Dynamics relates to the onset and end of emotions as well as its measurement over time. Since emotions often differ with the context of the user, it becomes vital to understand the user's experience and scenario in which the emotions are generated. Reliability of the methods of measurement becomes important since emotions reactions can vary at different times. Also since emotions are complex responses, the validity of measurement and evaluation of the intended emotions is essential. Measurement error refers to the random or systematic error which measurement emotions. Furthermore, they illustrate subjective and objective methods that are commonly used in evaluating customer emotion to an artifact. Subjective methods are concentrated towards description of feelings while objective methods record data like facial and vocal expressions. In subjective measures two established techniques of user evaluation based on product characteristics are Kansei Engineering and Semantic Scales. Kansei Engineering deals with the user's physiological feelings (such as affection, intuition, sensitivity) of the products. Semantic Scale relies on using adjective pairs of opposite meanings (such as fun-boring, open-closed) to evaluate the products.

Another approach of measurement of emotions is through using subjective rating scales of emotions induced by products. One of such techniques developed by Watson et al. is the PANAS – Positive Affect Negative Affect Schedule which measures the positive and negative mood states of the user during different times or contexts. This method measures positive feelings of enthusiasm, alertness and activeness (PA) and negative feelings of distress and displeasure (NA) using different descriptors. Jordan (2000) developed a questionnaire for measuring pleasure in products. It comprises of 14 questions that focus on user's feelings: stimulated, entertained, attached, sense of freedom, excited, satisfaction, rely, miss, confidence, product, enjoy, relax, enthusiastic and looking after the product. The users rate their feelings on a 5-point scale, from disagree to neutral to strongly agree.

Although all of the techniques mentioned above are useful in recording the emotions evoked by products, in my opinion, they do not help in capturing the stimuli or contexts that evoke these emotions. If a designer can gather holistic information about why those stimuli evoke these particular emotions, it can be used in the development of new products, to elicit pre-defined emotion profiles (Desmet, 2005).

This leads to the next section which introduces Design Probes as a tool to capture different emotions as well as the contexts and experiences that evoke these emotions.

2.5 Probing for happiness

Mattelmäki (2006) describes probes as design-oriented tools for understanding human phenomena and exploring design opportunities. The word probe suggests an automatic recording device that is sent to unknown territories where human researchers cannot go, from where it collects samples, and sends these back to the researchers (Mattelmäki and Battarbee, 2002). Probes are specifically designed material packages given to the potential users to document their private lives, contexts and experiences.

2.5.1 DESIGN PROBES: TOOLKITS FOR CAPTURING EMOTIONS

The contents of the probe kit are customized to suit the user group and the intended research; hence they differ from one project to another. The items in the probe kit are intentionally designed to be ambiguous, so that they can stimulate the thoughts of the participants and capture the essence of various emotions experienced by them. No hard deadlines are imposed on participants who do these assignments in their own time and natural environment allowing them to feel at ease and relaxed. Participants complete the materials and send them back to researchers for interpretation. One of the advantages of working on probes over extended periods of time (e.g. one week) is that it allows participants not only to reflect on the topic that is being researched but also on the answers they have provided on the previous days (Lucero et al., 2004).

Gaver, Dunne and Pacenti first introduced cultural probes [Gaver et al. 1999] as a form of exploratory and design-oriented self-documentation method. In an effort to explore new ideas for technology, Gaver et al. (1999) used the probes approach for user study for the first time. Cultural probes were applied to create a dialogue between the designer and the user in a project called Presence. This involved a set of tasks or exercises targeted for deriving inspirational response from the users. The probe kits contained tailored material like illustrated question cards, map exercises, disposable camera, photo albums and so on. Later during other projects by Gaver et al (2004), cultural probes were implemented to provide more open views and freedom for the designers to draw on their imagination in developing concepts for the users. These

probing techniques were specifically used to gain ambiguous and open responses by provoking people and stimulating their imagination. Hence, cultural probes were not meant for capturing comprehensive information about them, but fragmentary clues about their lives and thoughts (Gaver et al. 2004).

Consequently many designers and researchers adapted the cultural probes and applied them in their own projects for different contexts and uses. For example empathy probes (Mattelmäki and Battarbee, 2002), technology probes (Hutchinson et al., 2003), mobile probes (Hulkko et al., 2004), residential probes (Hemmings et al. 2002) and so on. This has helped them to find new ways of comprehending user experience, obtain a better understanding of their users and to inspire their designs. All these probes deal with different user contexts but the common motive is to encourage participatory design and allow for open-ended search for design opportunities. Unlike direct observation techniques like traditional field studies ethnography, the probing technique allows users to self-report. Probes are visual and tangible kits that include various kinds of descriptive and exploratory tasks such as photographing, diary-writing and collage-making. The aim of these tasks is to sensitize the users to observe, reflect upon and report their experiences (Mattelmäki, 2008). Probes are meant to support both the designers and the users in their interpretations and creativity. They are used to ask the users to experiment, express and explicate their experiences (Mattelmäki, 2006).

Mattelmäki (2005) identifies four reasons to use probes :

- *Inspiration – Probes can enrich and support the designer's or the team's inspiration*
- *Information – Probes can collect information about the users*
- *Participation – Probes can provide the users with an opportunity to participate in ideation*
- *Dialogue – Probes can build up an interaction between the users and the designers, as well as within the design team, in accordance with the user-centered design principles*

Mattelmäki divides the probes approach into two main components – producing observations and interpretations. The first component consists of the probes package that documents the user's experience in the form of actions, thoughts, attitudes, dreams and moods in real physical, social and cultural contexts. This component provides a basic understanding of the user's life and environment. The second component concentrates on deepening the understanding and adjusting the direction of interpretation. During this phase, interviews can be conducted to open up more avenues for deeper discussions about the user's life. In addition, projective tools like collages, scenarios and cartoons can be applied for more subjective and emotional aspects of experience (Mattelmäki, 2006).

Mattelmäki describes the different phases of probing process that facilitate dialogue between the user and designers and develop empathic understanding between them.

- Preparation and designing the probes – Here the designers and researchers outline the possible scenarios and experiences of the users in order to design the probes specific to the users' contexts.
- Collection of user data with probes – This phase activates the users and helps them reflect on their personal experiences through documentation and self expression.
- Probes interpretations – During the first overview of the probe package, the designers get a basic outline of the users which allows them to come up with detailed questions for

the next phase.

- User interviews with probes – To complement the data from previous phases, the designer conducts interviews with the users. Visual tools like images and cards are used to facilitate a meaningful dialogue.
- Communication of user data with probes for design interpretations – The visual and narrative data from the probes is then used by designers for inspiration. During this phase probes can also work as a communication tool between users, designers and other stakeholders.

As discussed above, variations and adaptation of probes have resulted into new opportunities for design and research. However, Gaver suggests that in the process of adapting probes, some researchers have also tried to rationalize the probing process (Gaver et al., 2004). Probes are originally meant to explore the ambiguous and uncertain nature of user data and are subject to playfulness and subjective interpretation. According to Gaver, such rationalization will mislead the expectations of companies that make use of these probing techniques for solution creation and decision-making processes. In such cases, the companies expect to see a straight forward, tangible solution as a result of the probing. However, probes tend to explore broader contexts rather than suggesting direct solutions and hence, it is difficult to establish a direct connection between probes results and the final solution. Thus, probes do not directly produce a single result but rather inform and influence the design process in different ways. Instead, probes usually provide a diverse range of potential themes, ideas and opportunities which determine the possible solutions.

On the lines of Gaver's argument, this thesis explores how design probes can be used to understand what makes users happy and to look at different possibilities, problems and opportunities in designing these happy solutions. The outcome of this thesis will not be targeted towards creating happy solutions for users but to direct the designers to the broader spectrum of themes and solution areas that would guide their design process in creating such solutions.

2.5.2 PROBES BUT NOT PROBES

Although this thesis focuses on design probes for the purpose of capturing happiness related information from the users, it is interesting to explore other techniques that have been used for understanding user emotions. This section introduces generative tools and techniques that employ similar playful and participatory approach for user research.

Vajakallio (2012) presents Design Games as a tool, a mindset and a structure. Design games refer to multidisciplinary workshops with playful activities as a part of product and service development processes. Design games are playful elements that promote a relaxed atmosphere and support discussion among the participants in a game-like spirit. In her dissertation, Vajakallio (2012) builds a Play framework that presents the elements and core qualities of design games. She suggests that design games can be seen as tools for organizing dialogue, supporting empathic understanding and gaining several contributions. In design games gaining user insights is not the goal as such; rather, the goal is the process of making the familiar unfamiliar and vice versa in order to elicit inspiration, empathy and fresh points of view on the phenomenon under development, which can then lead to novel design openings and improved services. In design games knowledge creation is a dialogical process of simultaneously gathering and sharing information, mixing information from different sources, contextualizing (interpreting) information, and generating design solutions to support mutual learning among a group of people (Vajakallio, 2012). With the help of design games, the designers can develop a playful and relaxed atmosphere of a design workshop by introducing playing rules and materials which in serves as a means to organize and direct the design workshops.

With the aim of discovering as-yet unknown, undefined, and/or unanticipated user or consumer needs Sanders (2000) introduces the Make tools. The Make Tools are a “design language” for users, not just for designers; a design language built upon an aesthetics of experience rather than an aesthetics of form. They facilitate exchange between the people who experience products, interfaces, systems and spaces and the people who design for experiencing (Sanders and Dandavate, 1999). In addition to the traditional approach which observes what people use, do, say or think, the make tools approach also focuses on what people make or create from the toolkits provided to them in expressing their thoughts, feelings and dreams. When all three perspectives (what people do, what they say, and what they make) are explored simultaneously, one can more readily understand and establish empathy with the people who use products and information systems (Sanders 2002).

I believe that although different techniques- Design Probes, Design Games and Make Tools follow different approaches, they share a common goal of understanding the human phenomena. The approaches vary in their structure but overall nature of the techniques point towards creating a relaxed and playful platform for a meaningful exchange of dialogue between the users and the designers. Since, the purpose of the research is to understand about happiness of the users; setting such a relaxed tone will help in making the users more comfortable while sharing their personal experiences, stories, needs and desires. In addition, the different mediums introduced in these techniques foster creativity and provide freedom to the users to express their emotions in the best possible manner. This learning will be beneficial for my research while designing the set of probes for happiness, as it will make the design probes more effective and help in collecting emotion-rich data from the users.

3

RETROSPECTIVE ANALYSIS OF CASE STUDIES

This chapter shows a retrospective analysis of 9 different case studies found in the literature with a view to understanding how design probes can be applied in different contexts. This chapter presents the typical items that comprised the probe kit in the case studies, the function of these probes and the insights that designers gained through the probing process in each case. The findings from this retrospective analysis define the basis of the design process of probes for happiness in Chapter 4.

Table 1: Retrosepective analysis of 9 case studies

Case	Field	Probe items	Functions of Probes	Insights for Designers
C1 Väinö project Applying user centered methods in concept creation for ageing people.	- Domestic - Wellbeing	- Illustrated cards with open questions - stickers and sticky notes - camera with assignments - for documenting their environment - A diary with open questions - Mapping and drawing tasks - Greeting card	- Collect empathic material - Create a holistic picture of individuals and personal values - Gather opinions, feelings, memories, daily routines and actions - Capture users' feelings of ageing, dreams related to living, their fears and shames, their opinions about happiness and good food - Gain motivational understanding of users - Assist in avoiding stereotypes - Form dialogue with users - Stimulate discussion - Make self documentation playful, motivating and easy - Provide different ways of expression	- Inspire design - Insights for design empathy - Incorporate statistical or theoretical material into the design process - Develop common understanding of user within the team - Understand future visions and megatrends
C2 Climbing club community Investigating the design and deployment of a situated display for the university climbing club	- Technology - Leisure	- Camera - USB pencam - Daily Diary	- Gather information about people's everyday lives and experiences - Open a dialogue with users - Understanding of mundane activities of day-to-day life - Understand user concerns	- Answering where, what, when, who and how questions related to the design - Assist in co-realization of design
C3 Domestic Environments Project Analyzing domestic lives of users for designing innovative technological applications for homes	- Domestic Wellbeing - Technology	- Camera - household rules pack - pinhole camera - Family and friends map - Photogram paper - Diary - Listening glass - Floor plan sketch pad - Dream recorder - Bathroom pad - Visitor's blog - Telephone pad	- Analyze motivation of users - Understanding daily lives of users - Trigger and capture emotional responses	- Inspiration for future designs
C4 Digital Care Project Understanding user needs to develop supporting technologies in order to improve quality of their everyday lives	- Technology - Well being	- Polaroid and disposable camera - Diaries - Map - Tape recorder - Photo albums - Postcards	- Information - Open friendly dialogue with users - Understand users emotional, aesthetic and social values and habits - Uncovering information from a group which is different to understand through conventional observation techniques	- Provide contextual frameworks for users' expectations - Uncovering comprehensive understanding of user needs

C5 Communication technology for family members living abroad Informing the design of communication technologies that allow people with family members living abroad to feel appropriate emotions when communicating	- Technology	- Spirit of oracle cards with an invitation - Digital Camera - Diaries - 'Journey with my family where I was happy'	- Understand day-to-day activities and contexts - Identify user needs and emotions - Understand practical constraints of communication technology - Stimulus for reflection and conversation - Understand emotional needs of communication	- Identify themes emerging from data - Inform design
C6 Probes in Hospitals Understanding nurses and patients, their work conditions, social aspects, physical environments.	- Healthcare	- Diaries - Cameras - Illustrated cards - Open questions - Other tasks	- Gain empathic understanding - Self-documentation of daily routine - Expression of thoughts, needs and expectations - Understanding authentic environment - Provide authentic environment descriptions, user profiles and use scenarios	- Seek opportunities and problems - Suggest possible guidelines for future designs - Develop user experience framework
C7 - Probing the Patient Experience Investigating patient experiences within healthcare systems	- Healthcare	- Journal - Camera	- Understand human phenomena - Self document interactions and emotions - Collect personal stories of patients - Gather information on personal contexts and perceptions - Gather experiential details - Understand daily life of users	- Explore 'unexpected' design opportunities
C8 - Discovering Madeira Using Cultural Probes in an early stage of a 'research-through-design' project aiming at innovations in social media.	- Social media - Community	- Instruction booklet - Diary - Camera - GPS device	- Gain understanding of users and their community - Engage and stimulate exploration - Invite creative responses from users - Stimulate creativity and ideation - Gain insights into users' values, concerns, aspirations, and accounts of everyday lives. - Trigger conversations	- 'Facilitate a degree of serendipity in approaching the insights while leaving room for a creative ideation phase'
C9 - Assisted living Designing assisted living technologies taking account of how real people live in real homes and communities	- Assistive technology	- Camera - Pen and paper - Photo album - Diary - Maps	- Collect of visual, narrative and material data - Promote dialogue between researcher and participant - gain insight into the rhythms, meanings and social influences	- Facilitate co-production

Many instances of design and innovation projects that make use of design probes can be found in the literature. Most of the projects have related to technology, healthcare services, but there are examples also from user studies in the wellness sector and co-design of leisure, community development and social media services (Mattelmäki, 2003; Rouncefield et al., 2005; Hemmings et al., 2002; Kim et al., 2009; Mattelmäki, 2006; Mullaney, 2012; Van Leeuwen et al., 2011; Wherton et al., 2012). In the majority of the projects users have collaborated with researchers in order to create new or develop better products and services. Most of the studies have been related to the early phases of the innovation process such as gathering need information, generating ideas and evaluating new product and service concepts.

In order to understand how design probes can be applied in different contexts of user study, the following section shows a retrospective analysis of different case studies found in the literature. (Mattelmäki, 2003; Rouncefield et al., 2005; Hemmings et al., 2002; Kim et al., 2009; Mattelmäki, 2006; Mullaney, 2012; Van Leeuwen et al., 2011; Wherton et al., 2012). For the purpose of retrospective analysis, the case studies in Table 1 have been selected in a manner that they represent a wide variety of fields and contexts in which the probes have been applied. While some of the cases were chosen because they encompass the whole innovation process from data gathering to idea generation and concept development of a product or a service; others were chosen to understand the focused use of probes for data collection, co-design and design inspiration.

By carefully examining the case studies, this section tries to answer the following questions:

- *What is the field and/or scope of the study?*
- *What are the contents of a typical probe package used for the study? How are these packages customized to suit the nature of the study?*
- *What is the function of the probes in this study?*
- *How does the data gathered from these probes translate into useful design relevant insights for the designers/researchers?*

The learning from this analysis will help in realizing the different characteristics of design probes and their practical application in different contexts. These characteristics will then be adapted and implemented for designing probes for happiness which will be practically tested during the Experimental User Study discussed in section.

3.1 Typical design probe items

The case studies in Table 1 were analyzed in terms of different probe materials used in various contexts to recognize the typical probe items that can be part of a design probes package. The following typical probe items were realized:

DIARY: One of the most commonly used probe is a diary (8 out of 9 the analyzed case studies suggest the use of this probe). Usually a diary is a booklet where the participants are asked to record their observations, feelings or activities during a certain period of time. It can have either open or more structured questions in the form of templates or questionnaires to guide and organize the participants' input. For example, in C2: Climbing club community, in order to understand about the participants' daily lives and experiences related to their climbing activities, they were asked to fill a diary as follows- Please write and/or paste in below stories, pictures, descriptions, jokes, sounds and video (for blog) relating to your experiences with any climbing club activities you have been involved in today. A diary is thus a medium for the participants to express the phenomena of daily and private life that they can easily identify with.

CAMERA (Photo/Video Documentation): Another typical probe used in many projects is a camera. Here the participants are provided with a photo or video camera and are asked to photograph freely or capture specific places or situations related to the research. The camera tools are mostly accompanied by a set of instructions on how they should be used, the number of pictures or videos to be captured, situations/ contexts/ keywords specific to the research, and how they should be delivered to the researcher. For instance, in C1: Väinö project, the participants were asked to photograph their favorite and most uncomfortable pieces of furniture, the best moment of the day and so on. This was done to identify with the living habits and quality of life of the senior citizens and apply the findings in concept creation for them.

DRAWINGS AND COLLAGES: Many times when it can be difficult to express feelings and emotional states verbally, drawing and collage exercises offer a variety of expression opportunities for the participants. These exercises can also be assisted with ready-made picture bases from magazine, cut-outs, photographs and stickers which result in the amalgamation of pictures and words offering both realistic and abstract expressions from the participants.

Case C6: Probes in hospitals made use of collages in order to illustrate the transportation process in a visual and humorous way and also suggest some possible guidelines for future designs.

HANDS-ON MATERIALS: The participants can be provided with hands-on materials such as LEGOs, modeling clay, etc. These three dimensional objects not only add playfulness to the exercise but also allow the participants to visualize their thoughts and provide interesting insights through them. For example, in Case C3: Domestic Environments Project, the participants were invited to explore the audioscape of their homes and were provided with a glass to amplify any sounds that they heard. The glass also acted as a recorder, enabling the volunteers to write down what they heard directly on to the glass.

MAPS: Maps provide a (mostly realistic) structure of a given space, e.g. a floor plan of a building or a geographic map. Participants can either record their observations or own activities within these maps, or they can fill it with visionary ideas. In Case C4: Digital Care Project the participants were given the map of the local area and various colored pens and post-it notes to enable residents to indicate favorite places, areas where they felt safe or threatened and so on.

SUPPORTING MATERIAL: Some supporting items can be also added to the probe package to assist the participants in performing the exercises. For example stationery items like pens, glue, and scissors were provided to assist in writing, drawing or collage exercises in all the cases in Table.

3.2 Functions of design probe items

This section highlights the most recurring functions of probes as seen in different case studies. These functions which will be later used to design the Probes for Happiness for an experimental study.

Table 1 presents the different function of design probe items in a variety of case studies. In Case C2: Climbing Club Community, the author mentions that the primary function of the probes was to collect information about the climbing club community members. This information was mostly directed towards understanding the daily activities of the members and their thoughts about technologies that could support climbing club activities. In another case, C9: Assisted Living, where the aim of the research was to facilitate the co-production of assisted living technologies for elderly people, probes helped in promoting dialogue between the researcher and the participant. The author specifically points out that probes helped as a medium to converse with the non-English speaking participants through an interpreter. In addition the probes helped them gain insight into the rhythms, meanings and social influences in the life of elderly people. Similarly, table 1 shows the function of probes in different cases as discussed by the respective authors in each case study.

The following list shows the most recurring functions of probes in the case studies.

- Probes facilitate the collection of visual, narrative and material data
- Probes allow collecting personal stories, expression of thoughts, needs and expectations.
- Probes assist in creating a holistic picture of participants and their personal values while identifying their needs and emotions.
- Probes help in studying the daily routines of the participants, valuable information of the mundane activities of day-to-day life and the concerns involved in them can be revealed.
- Probes provide an empathic understanding of the participants in terms of emotional, aesthetic and social values, habits and influences.
- Probes are useful in gaining motivational understanding of participants
- Probes inspire creative responses from participants
- Probes initiate friendly dialogue with participants and create a stimulus for conversation
- Probes engage and stimulate exploration
- Probes facilitate understanding of authentic environment and avoiding stereotypes.

3.3 Insights for Designers

This section presents the insights for designers that are generated by probing the probing process in different case studies. Since probes are meant to be ambiguous in nature, the results from probing do not necessarily generate direct solutions or ideas which can be readily implemented. Instead, probes create the following insights for designers which in turn lead to possible solutions.

INSPIRATION: The results from the probes can be used by the researchers or designers as a source of inspiration for future design. The data obtained from probing is not comprehensive and is open to interpretation. Hence, designers seek inspiration from the fragmented data sources and build upon it to inspire their design. Combined with the designers own experience, and skills probes aid in a certain degree of serendipity which inspires the creative ideation and concept development phases. In Case C3: Domestic Environment Project, it can be seen that the primary objective of the probing process was to gather inspirational data. The probes were thus designed to elicit inspirational responses from the participants which were later evaluated by the designers to find insights for future designs.

EMPATHY: Since probes elicit emotional responses from the participants, the data generated from probing techniques provides a comprehensive understanding of the user needs. The visual and narrative material from the probes can be used to create personas, scenarios and generate a deeper knowledge about the participants' lives. The personal stories, experiential details, authentic situations recorded in the probes thus provide grounds for the designers to enrich empathy in design. In addition, through continuous feedback from users' experiences to the design and development process, designers can also ensure co-realization of the final solutions. In case

C1: Vaino Project, the representations of the personas obtained by empathic understanding of the participants were used as tools to understand future visions and megatrends, such as what would spiritualism or hedonism mean to this specific persona and how would it affect to her needs and expectations of different services (Mattelmäki, 2003).

EXPLORATION: In companies the process of concept design begins with the designers researching the market and exploring what themes meet the customer's needs. The data derived from design probes can be utilized for identifying emerging themes which can be further elaborated to drive new perspectives and enhance the user-orientation in the company. In addition, it can offer the exploration of new opportunities, challenges and problems in order to present the designers with unexpected design possibilities. In case C5: The designers aim was to learn about the means of communication between family members that were separated by distance. The data obtained from the probes helped the designers in realizing six design themes including Finding time, Sending love, and Reflection. After exploring these themes, and carrying out further analysis and ideation sessions, the designers developed a device that would be used to send asynchronous media gifts to family members.

DIRECT DATA: To complement the subjective data derived from probes, in some instances direct data can also be helpful for designers to answer the typical where, what, when, who and how questions related to the design. In addition, the data can also assist in incorporating statistical or theoretical material into the design process. For example, In Case C2: Climbing Club, diary given to the participants attempted to address important issues surrounding the design of situated displays in terms of where display should be positioned, what the interface might look like, when the messages should be displayed, and how people might access the display.

FRAMEWORK: In order to understand the whole nature of user experience, designers can create frameworks emerging from the stories and other data from the probes. For example, Mattelmäki (2006) describes a framework of user experience and its use to review the data obtained from the probes in terms of different elements of the framework. In my opinion, in addition to reviewing the data, this approach can help in plotting the different elements of user experience that arise from the data obtained from the probing process. These contextual frameworks for users' expectations can help in understanding the different elements of user experience, the significance of these experiences, the methods that can be employed to address them and so on.

The retrospective analysis of case studies shows that different kinds of probe materials can be used in different contexts of user research. Depending on the function that these probes are expected to perform, designers can develop a set of probes that can include (but are not be limited to) the typical probe items. The data resulting from the probing process is then used by the designers to gain insights for design as discussed above.

The findings from this retrospective analysis will guide the design process of probes for happiness discussed in the next section. Since these case studies do not address the element of happiness in their research, the findings from the analysis will be used as a foundation and developed further to evoke and capture happiness in the participants during an experimental study. The resulting probes for happiness will comprise of the typical probe items as discussed in this analysis but will be specifically designed to elicit and capture positive emotions in the participants. The probe items will be selected and designed keeping in mind the different functions that are described in this analysis. To validate whether the probes for happiness can produce design relevant data, the data obtained from the probing process will be evaluated for the different insights for designers as discussed above. Thus, the retrospective analysis of case studies will not only be helpful in designing probes for happiness but also for evaluating the relevance of the data obtained from these probes.

4

METHODS

The fourth chapter discusses methods of data collection and analysis used in the research. First it establishes the background of the experimental study with coffee as the focus product. The chapter then describes the step by step process of probing for happiness. The design process of 5 tasks that comprise the probe kit for happiness is explained in detail. It further presents the planning and development of a workshop to simulate the design process in the company. It shows how a design team in a company analyzes and interprets the data from the probing process and eventually utilizes the data to explore different design opportunities to make the participants happy.

4.1 Experimental Study: Coffee Case

In order to explore how design probes can be used to capture happiness related information from the participants of a user study, this section describes an experimental study that I conducted for the purpose of this thesis. The study simulated the probing process for happiness for a specific focus group and product as carried out by user researchers in a company. With the help of this experimental study, this section describes the process of designing probes for happiness and the steps involved in the probing process. It also simulates how a design team in a company analyzes and interprets the data from the probing process and eventually utilizes the data to explore different design opportunities to make the participants happy.

The idea for this user study was born with my own interest and love for coffee, which began after I moved to Finland two years ago. Although in the beginning, coffee just felt like a “coping mechanism” for the extreme weather condition in Finland, later I started to notice its deep roots in the Finnish culture. Interestingly, I was surrounded by people who love coffee and consider it as an essential part of their daily lives. These people included not just the Finns but also immigrants from other countries where the culture of coffee is not that strong. I became interested in knowing more about the coffee lovers in Finland and started initial research on Finland and its coffee consumption.

Finland is the biggest consumer of coffee in the world. According to the International Coffee Organization’s Coffee Market Report (September 2009), on an average, people in Finland (Finns and immigrants) consume around 12 kilograms of coffee per capita per year. This is over twice the amount of coffee consumed by other Europeans. In Finland, coffee is central to many festivities and events. Finland is the only country in the world that has made coffee breaks at work statutory (Ojaniemi, 2010). These breaks not only help in keeping up the employees’ working morale but also serve a social purpose of bringing the people

together. Timo Voipio, Senior Adviser for Global Social Policy, Ministry for Foreign Affairs of Finland, describes coffee as an integral part of Finnish culture: it is seen as a commodity that everyone is entitled to, and coffee consumption is little affected by income levels or coffee prices (Ojaniemi, 2010). Due to globalization, Finland has been exposed to specialty coffees and latest coffee trends which has played an essential role in changing people’s tastes and habits related to coffee.

Recent reviews of the effects of caffeine on mood and behavior indicate that moderate levels of caffeine consumption have positive effects on mood and certain types of performance, for example, energy, self-confidence, alertness, ability to concentrate, and motivation to work. Also most caffeine consumers self-regulate intake to maximize positive effects and minimize negative effects (e.g., anxiety, jitteriness). (Newton, 2009). Thus, coffee appears to affect a number of neurotransmitters related to mood control, so drinking a morning cup could have an effect on your general sense of wellbeing (Fredholm et al., 1999). This makes coffee an interesting topic to study in terms of understanding how it relates to people’s happiness.



To explore the relationship between coffee habits and happiness and to gather qualitative data in this field I designed a set of probes for coffee lovers.

I wanted to understand the role of coffee in their lives and how it translated into their happiness. My aim was to collect examples of daily scenarios of coffee drinkers, as well as special circumstances and situations, information about the coffee habits, different factors that affect these habits, as well as evidence about how coffee influences the positive emotions or happiness in the coffee lovers.

4.2 Procedure

The aim of the experimental study was to understand the role of coffee in the lives of the participants and how it translated into their happiness.

For this, it was essential observe the habits of the participants specific to coffee as well as to gather more inspirational data by studying their daily routines and preferences in other contexts. In addition to learning about how the participants relate their happiness to coffee, it was also necessary to understand about how they associate happiness with other aspects of their lives. For this purpose, I conducted the following probes study which consisted of six parts:

- Finding the focus group
- Making the probes
- Sending the probes
- Collecting the probes
- Interpreting the probes

4.2.1 FINDING THE FOCUS GROUP

A simple question was asked to 35 people, mostly friends and colleagues, “Do you love coffee? Note: You may or may not be a compulsive coffee drinker, but do you enjoy drinking coffee? ”. I chose to approach friends and colleagues for the purpose of this study as they were easily available as well as suitable for the purpose of this study. Out of these, 28 people who answered “Yes” were initially recruited for this study. They all agreed to participate in the study although ultimately only 22 worked on the probes and sent them back. The participants varied in their profession (designers, engineers, scientists, housewife), age (between 24 and 40), and gender (14 male, 8 female). They worked on the probes in their homes and/or workplace for a period of one week. I obtained a wide variety of contexts, ranging from a compulsive coffee drinker who cannot function without drinking coffee to someone

who enjoys drinking coffee once a week. Having such a diverse group was challenging in terms of the time and resources allocated for the probing process of each participant. However, it seemed beneficial to engage such a diverse group in order to gain different perspectives and learn about various contexts for the purpose of this study.

4.2.2 MAKING THE PROBES

To begin the process of building the probes, it was essential to first define the dimensions on which the probes would be developed. These dimensions would take into account the different types of information that the probes would address. This would include learning about the participants, their daily habits, their preferences in terms of coffee, happy memories related to coffee and about other aspects of their lives, their experiences, emotional responses and so on. In order to gain such a holistic understanding of the participants, a matrix with 3 sets of dimensions was developed as a foundation for designing the probes. These dimensions are determined based on the nature of the data addressed by the probes, the scope of data explored in the process and the medium in which this data will be expressed by the participants. In later sections, this dimension matrix will also be used to review the data obtained from the probing process which will be further used to develop a set of guidelines for designing probes for happiness.

DIMENSION A : NATURE OF DATA

1. Personal
2. Contextual

As discussed before, happiness is very subjective and is dependent on both personal and contextual aspects. While the personal questions in the probe kit were targeted towards gathering information related to the participants themselves, the contextual questions aimed towards understanding how different contexts or external aspects (like surroundings, people, places) affect the participants.

DIMENSION B: SCOPE OF DATA

1. Open
2. Specific to coffee

The objective of the open questions was to understand factors like routines, needs, preferences, and most importantly the emotions related to the participants in different contexts of their daily life. On the other hand, the questions specific to coffee were explicitly intended towards understanding how the above factors are affected due to the participant's coffee drinking habits.

DIMENSION C: MEDIUM OF DATA

1. More Visual (Less Textual)
2. More Textual (Less Visual)

The tasks were designed in a way that they gave the participants flexibility to express themselves in the form of visual and textual elements like photos, drawings, text and so on. The objective of this dimension was to assess which of the two: visual or textual tasks, allowed the participants to articulate themselves in a better way. The More Visual tasks primarily focused on gaining information in the form of visual mediums which included photos, stickers, drawings and so on. In addition, the participants were given an option to use textual elements to support and enhance the visual information. The More Textual tasks, on the other hand, required the participants to answer the questions in text format with an option to support and enhance the information with visual elements as mentioned above.

Thus, in Figure 2, the dimensions A and B provided a basis for forming the questions while the dimension C provided different mediums for asking and answering these questions.

		DIMENSION C- MEDIUM OF DATA			
		VISUAL	TEXTUAL		
DIMENSION A - NATURE OF DATA	CONTEXTUAL			OPEN	DIMENSION B - SCOPE OF DATA
				SPECIFIC TO COFFEE	
	PERSONAL			OPEN	
				SPECIFIC TO COFFEE	

Figure 2: Dimension Matrix for building probes for happiness

DEVELOPING THE TASKS

Based on the dimensions defined in the previous section, 5 different tasks were designed to be included in the probe kit to collect information about the needs, habits, daily routines and emotions from the participants of the experimental study. Each task was developed based on the intersection of the elements of the matrix. For instance, Task 2 was developed to gain data about the participant's personal choices, where the scope of the data was kept open and the participant was given more visual mediums to express himself. Similarly Task 5 explored the different contexts of the participant's life, asked questions specific to coffee and allowed the participants to express this information through textual medium. Thus, each task explored data with respect to the different dimensions of the matrix and the resulting data from all 5 tasks gave an overall understanding about the participant.

The following Figure 3 shows tasks 2-5 plotted on the dimension matrix

		VISUAL	TEXTUAL		
CONTEXTUAL		TASK 2- ABOUT YOUR DAY What are you doing today? How is your day? Capture your mood/feelings during different times of the day using your cell phone camera. Take at least 3 photos (per day). Feel free to write a few words about each photo.	TASK 2 - ABOUT YOUR DAY What are you doing today? How is your day? Write about this in the space below. Use the smiley face stickers and write a few words about your mood/feelings during different times of the day. Free to explain more using simple sketches, photos, etc.	OPEN	
		TASK 3 - NO COFFEE Imagine a situation where you would not get coffee for a day. How would you feel? How would it affect your life, work, etc? Draw a simple sketch of yourself this situation. Feel free to use words, slogans in the sketch.	TASK 3 - NO COFFEE Imagine a situation where you would not get coffee for a day. How would you feel? How would it affect your life, work, etc? Write about this in the space below. Feel free to explain more about this situation using simple sketches, taking photos, etc	SPECIFIC TO COFFEE	
PERSONAL		TASK 4 - HAPPINESS & YOU What are the different things/places/people around you that matter to you the most and make you happy? Capture these using your cell phone camera. Take at least 10 photos. Feel free to write a few words about each of photo.	TASK 4 - HAPPINESS & YOU What are the different things/places/people around you that matter to you the most and make you happy? Write about this in the space below. Feel free to explain more using simple sketches, photos, etc.	OPEN	
		TASK 5 - LOVE FOR COFFEE Select 3 doodles to convey what is it about coffee that you love the most. Draw your own happy doodle. Feel free to write a few words about it.	TASK 5 - LOVE FOR COFFEE What is it about coffee that you love the most. Why does it make you happy? Write about this in the space below. Feel free to explain using simple sketches, photos, etc.	SPECIFIC TO COFFEE	

Figure 3: Probe tasks plotted on Dimension Matrix

TASK 1 - QUESTION CARDS

In this task, the participants were asked to answer 8 multiple choice, closed questions covering different aspects of routines, habits, and preferences related to coffee. For example, how often they drink coffee, which is their most favorite coffee and so on. The questionnaire was developed into set of 9 cards where each card had 1 question on one side and a coffee illustration on the other side. The illustrations were carefully selected to make the cards visually appealing and to stimulate the participants to answer the questions.



Figure 4: Question Cards with Illustrations and Questions

TASK 2 - ABOUT YOUR DAY*

This task was targeted towards gaining information on the personal aspects of the participants. It was designed to gather information about the daily routine of the participants. Out of the 5 tasks in the probe kit, task 2 was the only one which the participants had to perform every day for 5 days. It served as a timeline to probe the daily thoughts and activities of participants. The task was kept open and no specific questions related to coffee were asked in order to get an overall picture of the daily habits of the participants. In addition the participants were also encouraged to express the different feelings and emotions they experienced at different points of the day.

Visual task – The visual task allowed the participants to capture their mood and feelings during different times of the day using their cell phone camera. They were asked to take at least 3 pictures daily in order to describe their day. An optional description sheet was provided so that the participants could write a few words describing the pictures. They were also provided with photo tags to write the title of the picture and hold it in frame while taking the picture. An example for using the photo tags and their writing their description was provided in the description sheet. They were informed to use the same title in the description sheet so that, later during the analysis phase, it was easy for the designers to match the picture with the right description.

Textual task – The textual task consisted of a Daily Diary. The diary consisted of two parts. First, the participants were asked to write about what they were doing on that day. Secondly, to make the task interesting and fun, the participants were given a sheet of stickers with smiley faces depicting happy, neutral and sad emotions. They were encouraged to use the smiley face stickers to represent their mood and feelings and write a few words describing the feeling. The participants were also given an option to creative express more about their feelings using simple sketches, photos and so on.

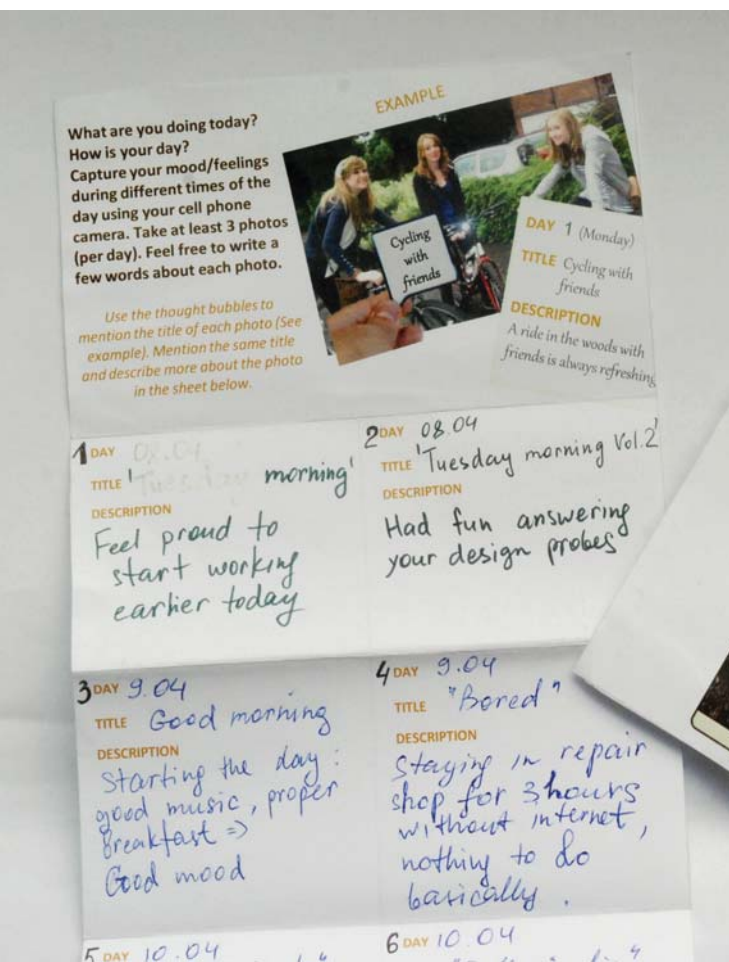


Figure 5: Visual task - Participant using the photo tag to take pictures and

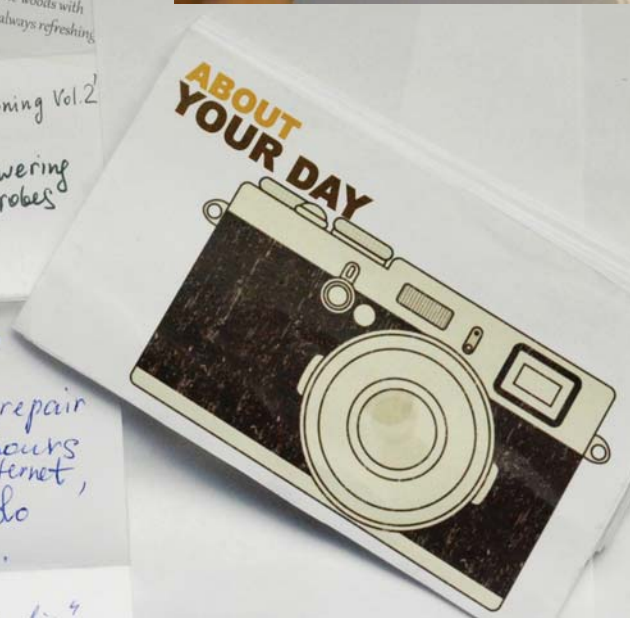


Figure 6: Description sheet with details of the photo

**DAY
4**

How is your day?

What are you doing today? How is your day?
Write about it in the space below. Free to explain more using simple sketches, photos, etc.

As the big day approaches,
I'm nervous and stressed out.
I feel like I need expel my
negative thoughts into the air.
I will jog today as it's
bright and sunny!



How are you feeling today?

Use the smiley face stickers and write a few words about your mood/feelings during different times of the day. Free to explain more using simple sketches, photos, etc.

My sneakers and a long run in the woods made me feel good!

**ABOUT
YOUR DAY**



Fig. 7: Textual task - Daily diary to note activities and emotions

**DAY
3**

How is your day?

What are you doing today? How is your day?
Write about it in the space below. Free to explain more using simple sketches, photos, etc.

- Day 2 of the Turkey trip.
- We are in Cappadocia, saw many wonderful things
- an underground city, a green valley, ancient cave dwellings, really awesome
- Had some Turkish tea and coffee

How are you feeling today?

Use the smiley face stickers and write a few words about your mood/feelings during different times of the day. Free to explain more using simple sketches, photos, etc.

- Over the moon
- Grateful to Go
- Very wonderful



TASK 3 - NO COFFEE

Since most of the questions in the probe kit recorded the feelings of the participants in the presence of coffee, this task was specifically added to the kit to understand how the participants would feel or react in the absence of coffee. The aim of this task was to let the participants reflect on the importance of coffee in their life and imagine how the absence of coffee affected their personal aspects in terms of moods, energy levels, productivity and so on.

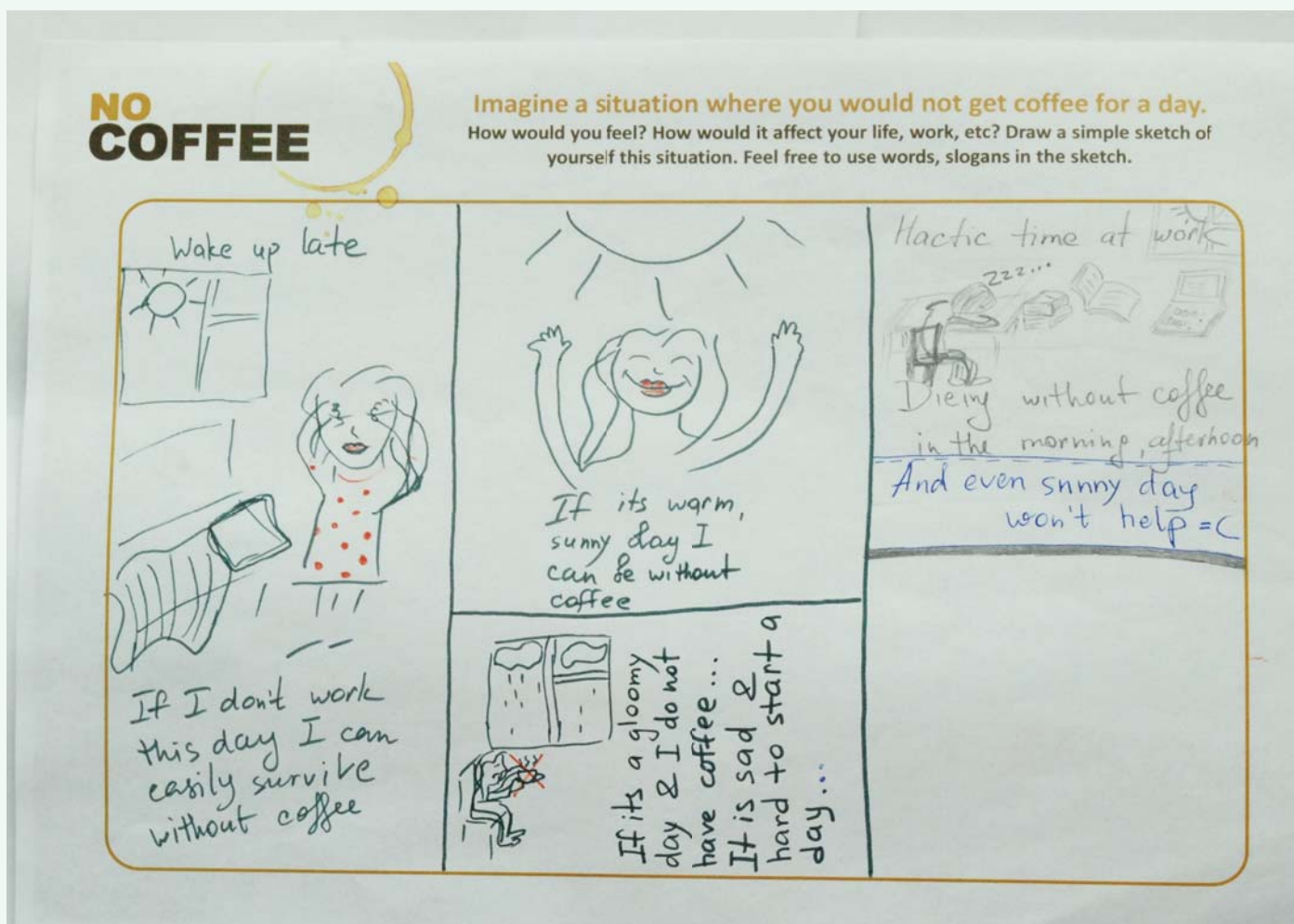


Figure 8: Visual Task - Using drawing as a medium to communicate the feeling on a day without coffee

Visual task – This was a drawing task where the participants were asked to draw a simple sketch describing them in a situation where they did not get coffee for a day. They were also provided with an option to use words, slogans in the sketch to explain more about the situation and make the sketch more descriptive.

Textual task – This writing task asked the participants to describe in detail about them in the situation mentioned above. Optionally, they were encouraged to explain more about this situation using simple sketches, taking photos and so on.

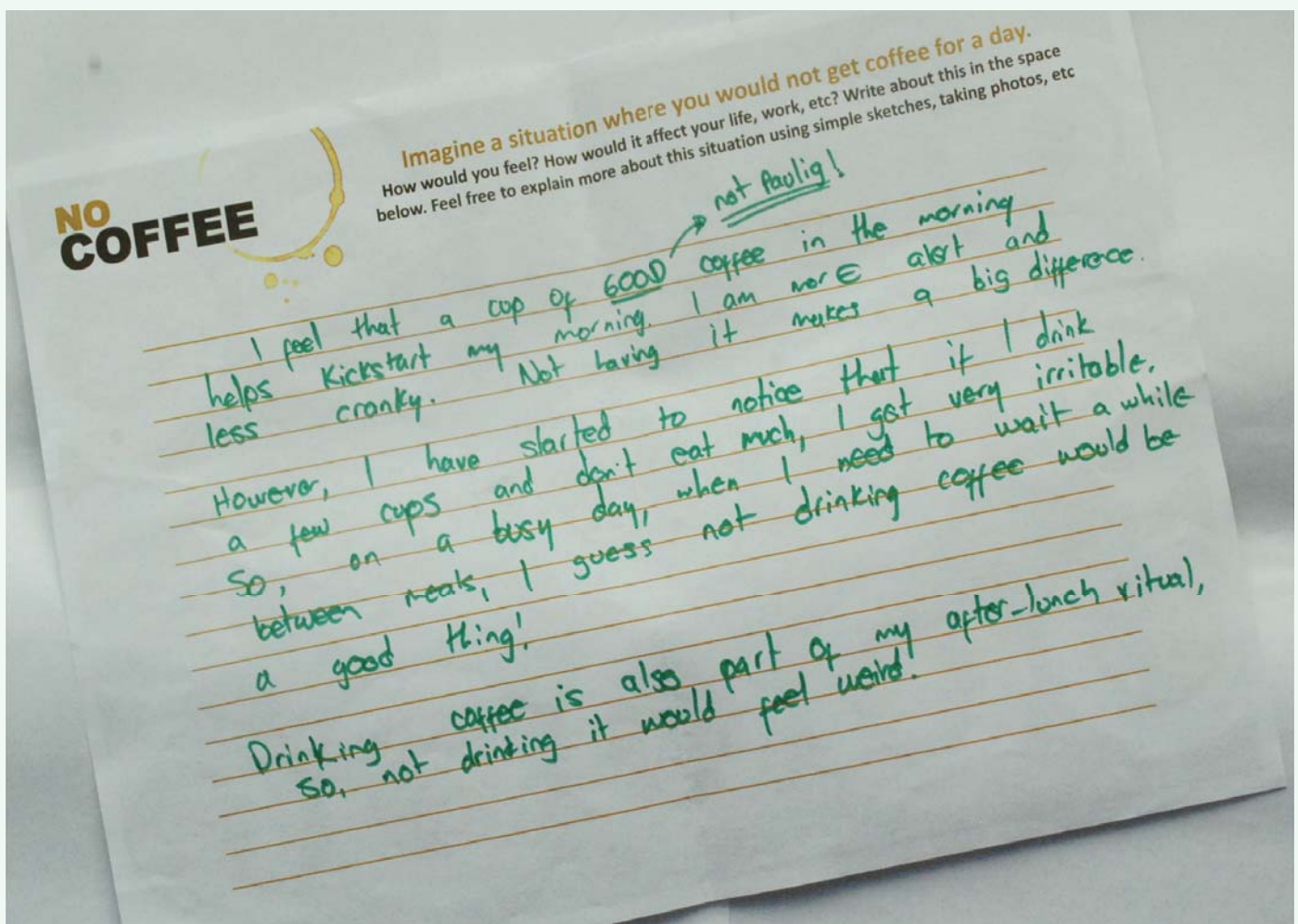


Figure 9: Textual Task - Participants expressing their day without coffee through writing.

TASK 4 - HAPPINESS AND YOU

An individual's happiness is subject to many different factors. This task was designed to understand how different people, places and things surrounding the participants affect their happiness. The participants were asked to take photos or write about these factors to that matter the most to them and play an important role in making them happy. Thus, by asking an open question about what brings happiness to their lives, this task was aimed towards gaining a better contextual understanding of the different aspects that affect the participants.

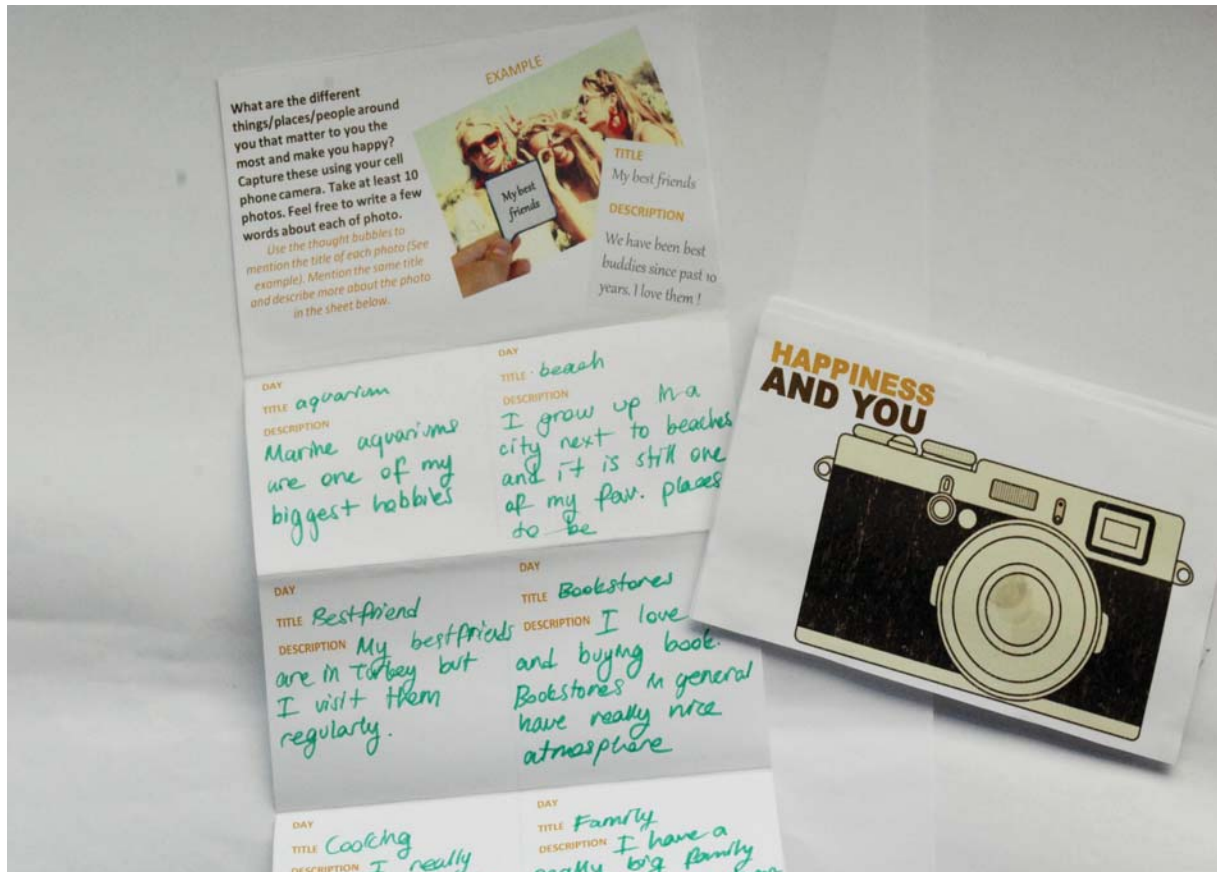


Figure 10: Visual Task-Photos of things that matter the most to the participant and the description sheet for details about the photos.

HAPPINESS AND YOU

What matters to you the most?

What are the different things/places/people around you that matter to you the most and make you happy? Write about this in the space below. Feel free to explain more using simple sketches, photos, etc.

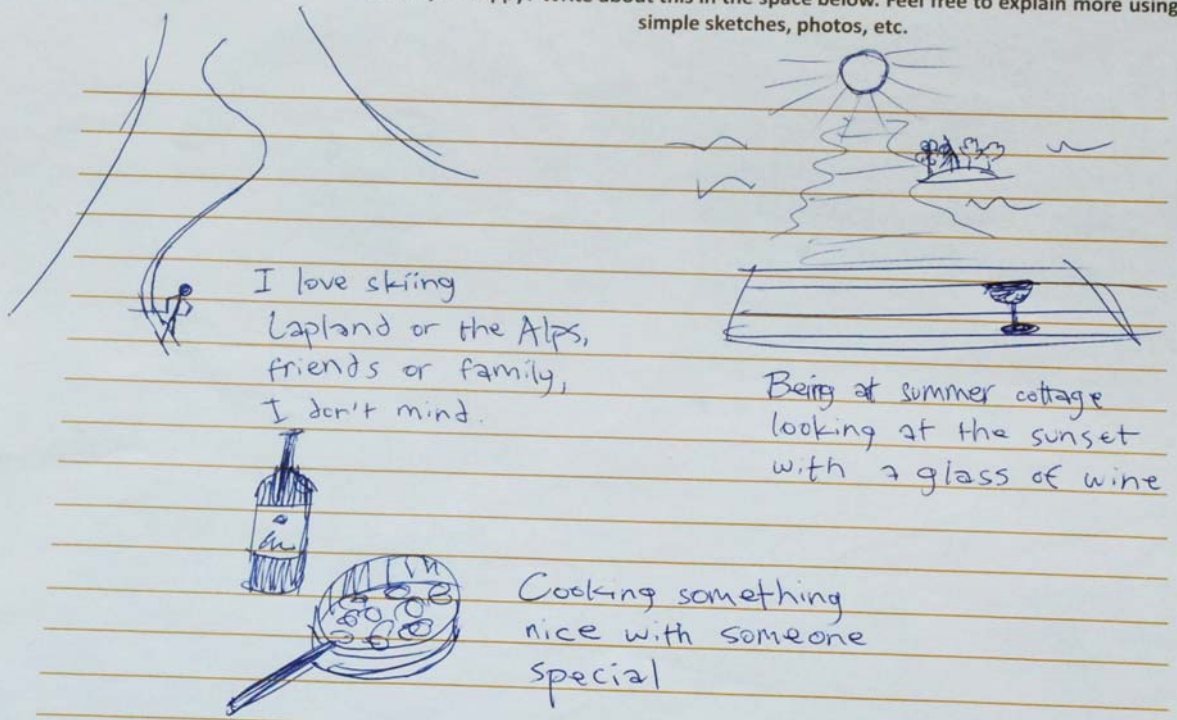


Figure 11: Textual Task - Participants using text and drawing for describing things that matter to them the most

Visual Task - The visual task allowed the participants to take pictures of the different aspects around them that matter the most to them and make them happy. The participants were asked to capture at least 10 pictures for this task using their cell phone camera. An optional description sheet was provided so that the participants could write a few words describing the pictures. They were also provided with photo tags to write the title of the picture and hold it in frame while taking the picture. An example for using the photo tags and their writing their description was provided in the description sheet. They were informed to use the same title in the description sheet so that, later during the analysis phase, it was easy for the designers to match the picture with the right description.

Textual task - This writing task asked the participants to describe in detail about different people, places and things surrounding the participants affect their happiness. Optionally, they were encouraged to explain more about these aspects by using simple sketches, taking photos and so on.

TASK 5 - LOVE FOR COFFEE

People love coffee in different ways. Some enjoy the smell or taste of coffee, some enjoy a good company while drinking coffee and others relate to coffee with different situations and experiences. This task was designed to understand the different contexts in which the participants make, consume and enjoy coffee. This task was very specific to understanding how participants directly relate love and happiness to coffee.

LOVE FOR COFFEE

What makes you happy ?

Select 3 doodles to convey what is it about coffee that you love the most. Draw a doodle to express what makes you happy. Feel free to write a few words about it.
Place a heart sticker next to the doodle you choose. Get inspired from the doodles to draw one yourself.



A cup of coffee and a good book.



Not having to worry about running out.



The smell of a freshly opened can.



That early morning smell.



Grinding coffee beans.



Turkish coffee and a little piece of chocolate



Coffee and catch-up.



Someone bringing you a cup to wake you up.



A cosy coffee shop



Remembering that you still have some left in your cup.



Paying for a small but getting a medium instead.



Black and strong.



Homemade and iced.



Sweet and warm from a thermos.



A new coffee-maker.



Using whipped cream instead of milk.



A treat cup in the middle of the day.



Your favourite mug.

Draw your own happy doodle here!



Describe why this makes you happy:

Cigarettes and coffee is a good match, especially when you are working.

Figure 12: Visual Task- Participant using different mediums to describe what he loves the most about coffee

Visual task – This task was two-fold. In the first part, the participant was provided with a series of 18 doodles expressing different aspects that people love about coffee. The participant was asked to choose 3 doodles, by placing heart shaped stickers next to them, which represent their love for coffee. The second part of the task involved the participants to get inspired by the doodles and draw a simple doodle describing what it is about that they love the most. They were also provided with an option to write a few words to explain more about the doodle.

Textual task – This writing task asked the participants to describe the different aspects that makes the participants love coffee. Optionally, they were encouraged to explain more about this situation using simple sketches, taking photos and so on.

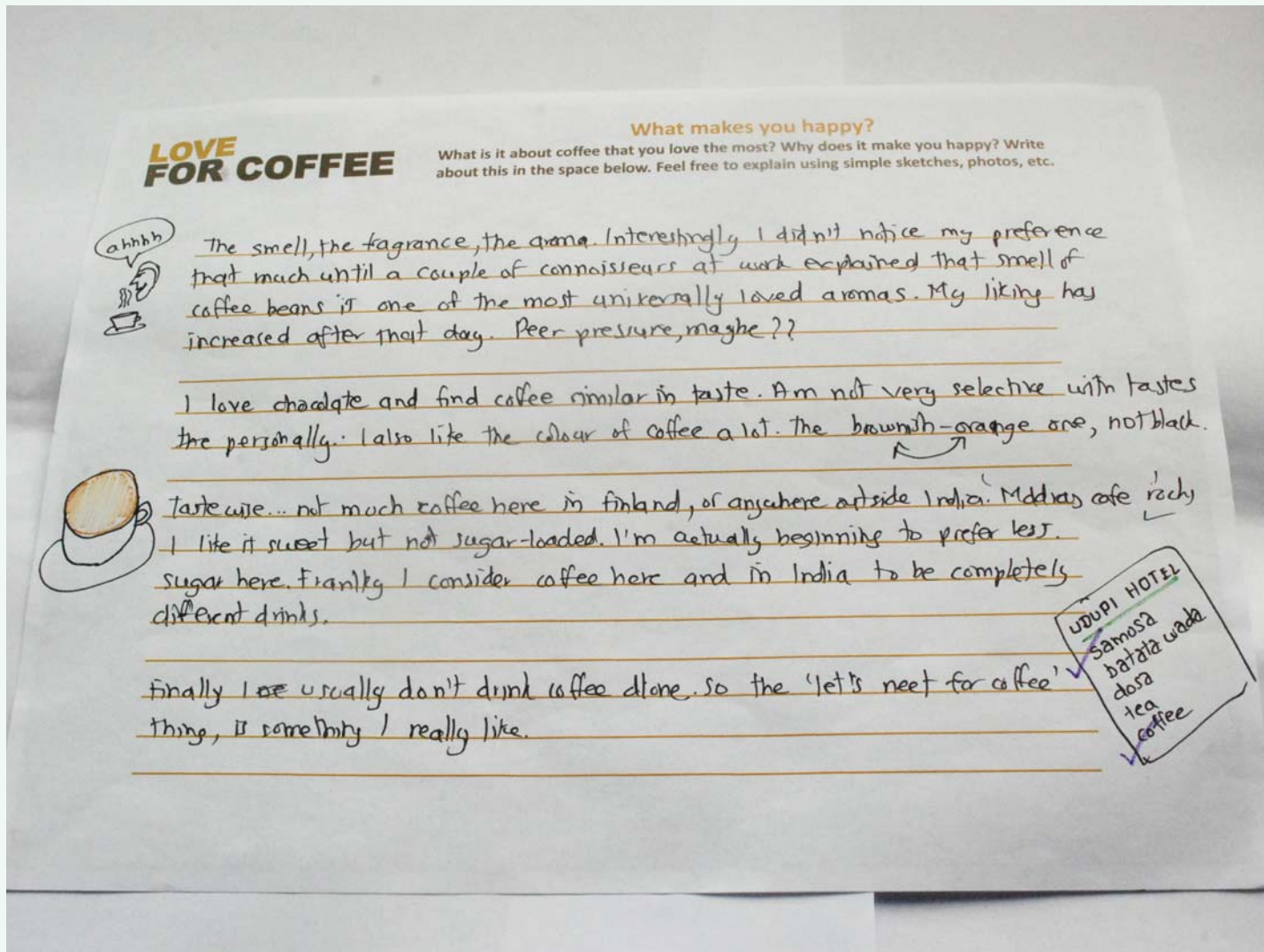


Figure 13: Textual Task- Participant writes about what he loves the most about coffee. Uses sketches to make the description more interesting.

Each probe kit consisted of the following materials:

- Introduction Sheet
- Task 1 - Question cards
- Task 2 - About your day
- Task 3 - No coffee
- Task 4 - Happiness and you
- Task 5 - Love for coffee
- Stationery/supporting material : Stickers, photo tags or callout bubbles, markers and glue



Figure 15: Contents of probe kit with different combination of tasks (Set 4)

A significant amount of work and resources was allocated to create an inspiring probe kit. The materials were designed with great care so that it was appealing to the participants and gave a feeling that the probes were specially made for them. Upon receiving the probe kit, the participants had very positive comments and reactions. While one participant appreciated the rustic and simple look of the materials, another participant found the illustrations provided with each task, especially the question cards very appealing. One participant particularly admired the simplicity of the daily diary and was excited by the idea of using smiley face stickers. The textual tasks were designed to visually stimulate writing. Simple fonts and layouts were used in crafting the tasks to make the probes look elegant and less cluttered. When planning the probes special consideration was given to account the nature and context of the study, especially, where and how the participants would most likely use the material to perform the tasks. For example, the participants were expected to carry the material for the daily task with them all the time. Thus,

the different materials like the daily diary, photo tags, description sheets and stickers were designed so that they could be easily carried around in the pocket or a bag. Thus, the probe materials elicited a simple and easy-going feeling so that participants felt comfortable in sharing their experiences and not get overwhelmed with the tasks.

Although all the participants received the same 5 tasks in the probe kit, the Dimension C from the Dimension Matrix (More Visual/ More textual) was implemented to create 6 different sets. Each set consisted of either visual, textual or a mix of both tasks. These sets were created to evaluate how visual and textual mediums affect the way in which participants perform the tasks, express their emotions, describe their routines and represent their feelings of happiness. The following Figure 16 shows 6 different sets of the probe kits, the number of participants that these sets were given to and the number of probe kits that were filled and returned for analysis.

	<i>Set 1</i>	<i>Set 2</i>	<i>Set 3</i>	<i>Set 4</i>	<i>Set 5</i>	<i>Set 6</i>
<i>About your day</i>	Visual	Textual	Visual	Textual	Visual	Textual
<i>No Coffee</i>	Visual	Textual	Visual	Textual	Visual	Textual
<i>Happiness and You</i>	Textual	Visual	Textual	Visual	Visual	Textual
<i>Love for Coffee</i>	Visual	Textual	Textual	Visual	Visual	Textual
<i>Number of participants that were provided the probe kit</i>	5	4	4	5	4	4
<i>Number of participants that filled and returned the probe kit</i>	5	3	3	5	3	2

Figure 16: Sets of probe kits with combinations of various visual and textual tasks

4.2.3 SENDING THE PROBES

All participants were given the probe kit during a personal meeting. The meeting involved a short discussion about the study, the contents of the probe kit followed by instructions to perform the tasks. It was stressed that nothing in the probe kit was compulsory. The instructions were merely suggestions and the participants were free to use the materials in whatever way they felt was comfortable and efficient to express their feelings. The only requirement was that the participants spend at least 20-30 mins each day over the period of 1 week to perform the tasks. Thus, the meeting set an informal tone for the study and motivated the participants to freely answer the questions and express their feelings with the tasks. In my opinion, this helped in inducing the positive feelings of comfort and relief in the participants even before they started working with the actual probes.

4.2.4 COLLECTING THE PROBES

All the probe kits were collected personally from the participants over the period of 2 weeks. The participants were thanked for their involvement in the study and congratulated for successfully completed all the tasks. They were also assured that the data would only be used for research purpose in this study. After the meeting the participants sent the pictures taken during the tasks either by email or by file sharing like Dropbox and iCloud.

4.2.5 INTERPRETING THE PROBES:

After the probes kits were collected, the data was processed for interpretation during day long workshop by four designers, including myself. This workshop was carried out with a view to simulate how a design team in a company analyzes and interprets the data from the probing process and eventually utilizes the data to explore different design opportunities to make the participants happy.

The workshop was structured as following:

1. Individual analysis – where each designer individually analyzed the data from the probes
2. Team Analysis – where all four designers discussed and analyzed the findings from individual analysis
3. Categorization of data – where all the findings from the team analysis was categorized for further analysis
4. Results – where the findings from the analysis were discussed
5. Application Test – where the results were utilized to create solution areas for products and services

Workshop Objectives:

The workshop was conducted with the following objectives:

1

To evaluate the data gathered from the participants in terms of inspiration, information, participation and dialogue and discuss if the data can generate design-relevant information for ideation phase.

This discussion would support in answering research question 1 – How can design probes help capturing happiness related data from the users? Does this probing process generate enough design-relevant data that can be utilized for ideation or concept development of products or services that are aimed towards bringing happiness to the users?

2

To discuss the different characteristics of the data which the designers found helpful in deriving the most relevant information about the happiness aspects of users.

This discussion would guide in answering the research question 2 - What are the essential elements that should be considered while designing probes that are specifically targeted towards capturing happiness related data during a user study?

Most of the workshop was concentrated towards these objectives and the outcomes of the discussion were used to formulate the final findings in this thesis.

Application test

To translate the data obtained from probes into the “happy” ideas or concepts. This objective would help to quickly test the relevance of the data obtained from the probes for happiness and its practical use to ideate different solution areas for happy products and services. To achieve this objective a quick brainstorming and ideation workshop was scheduled on the same day.

Process:

Before the workshop began, the pictures sent by all the participants were printed and placed with the appropriate descriptions in their respective probe kits. After this, the probe kits were separated into 6 representation sets as mentioned in the previous section. These kits were then carefully divided among the 3 design team. Each designer including the author evaluated 5 probe kits that belonged to 2 different sets. That way the designer could later compare and reflect the differences between the outputs of the two types of sets.

INDIVIDUAL ANALYSIS:

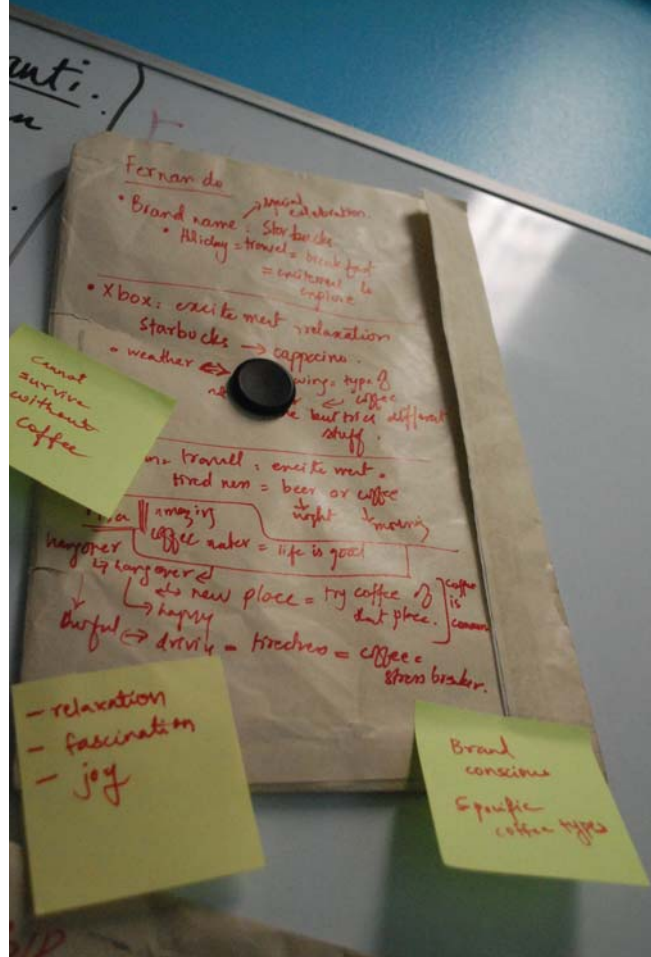
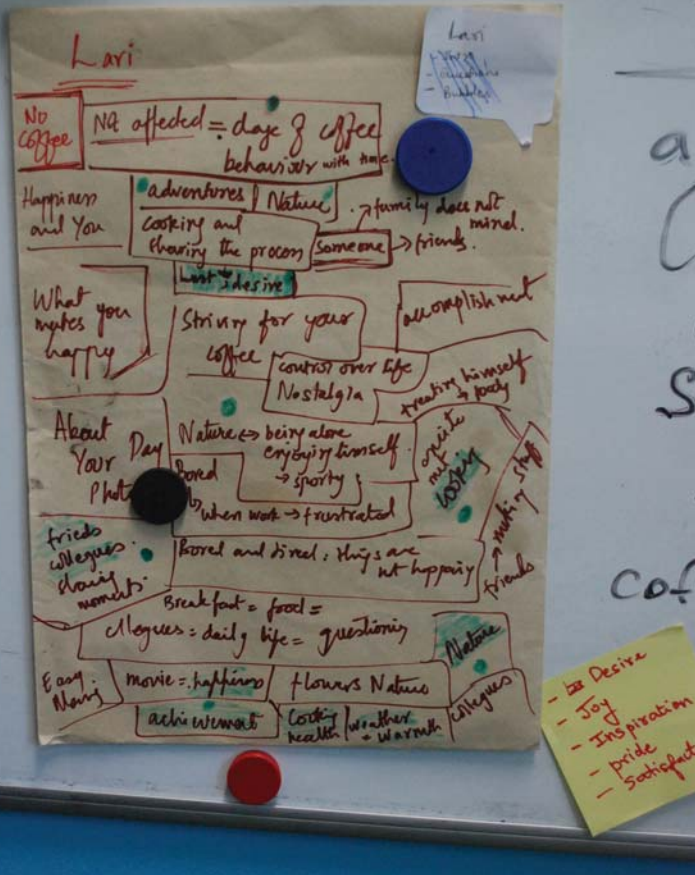
At first, the designers carefully studied the data from the kits that were allotted to them. The designers looked for key points that defined the persona of the participant. In addition, interesting facts or stories about the participant and different aspects that made the participants happy were noted down. The data from each participant was summarized and written down with key points and reflections. General findings were formulated and to be presented to the other designers for an open discussion.

TEAM ANALYSIS:

Once the designers had studied the data individually, the data was presented to rest of the team. Here the designers discussed about the personas of the participants, the main characteristics of the participants and their lives in general, their motivation levels for performing the tasks, the quality and quantity of data produced by each participant, different emotions evoked in the data and so on. At this point the similarities and differences between the different sets of probes were also discussed. In addition, different stories about the participants, some of their interesting experiences and most importantly the factors that contributed to their happiness were shared within the team. For each participant, the designers extracted and noted down at least 3 positive emotions that came across from the data. For this the designers referred to the list of 25 positive emotions by Desmet (2012).

CATEGORIZATION OF DATA:

The data from all the participants was categorized and commented on to highlight the important aspects from each participant's data. Tables with the participants' data and the set (1-6) they belonged to were created as a way to have a clear overview of the rich data that had been collected from different sets.



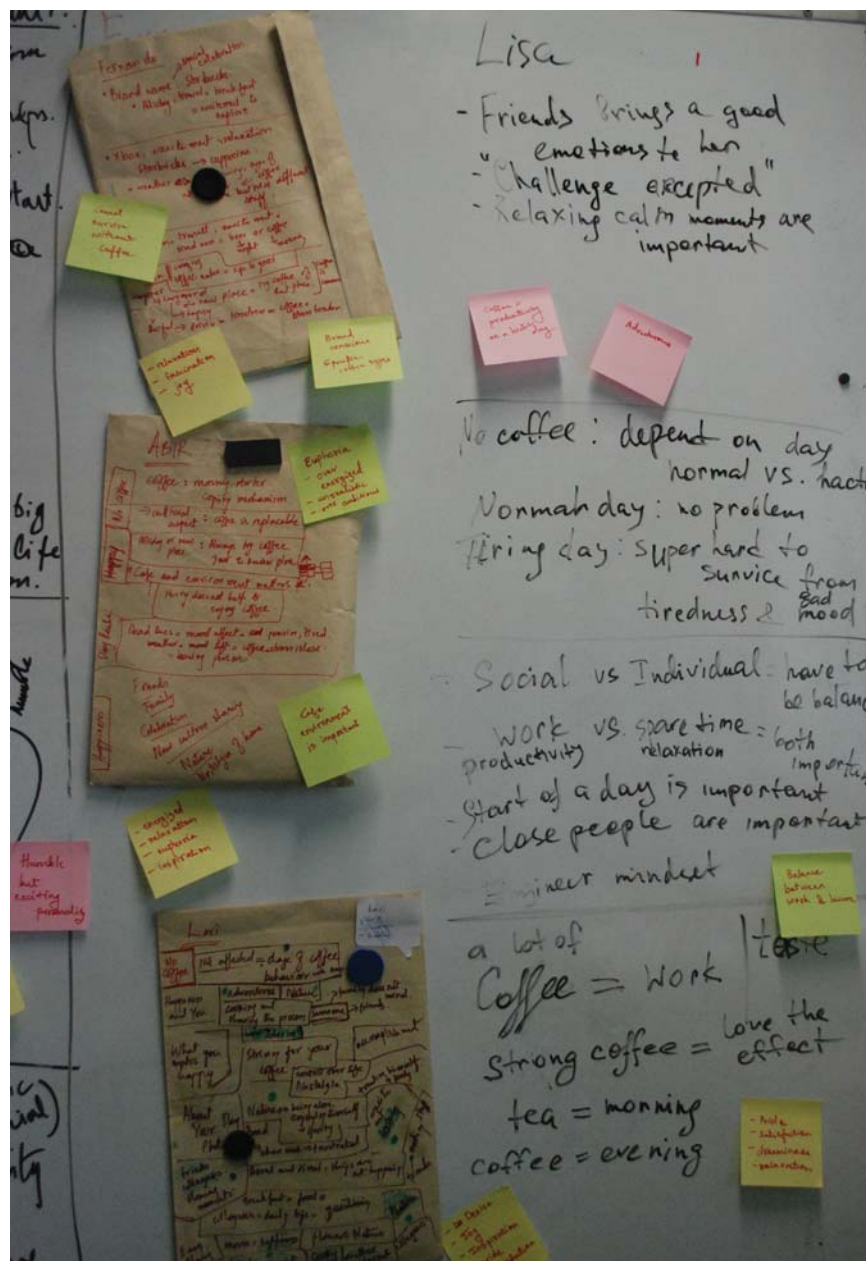
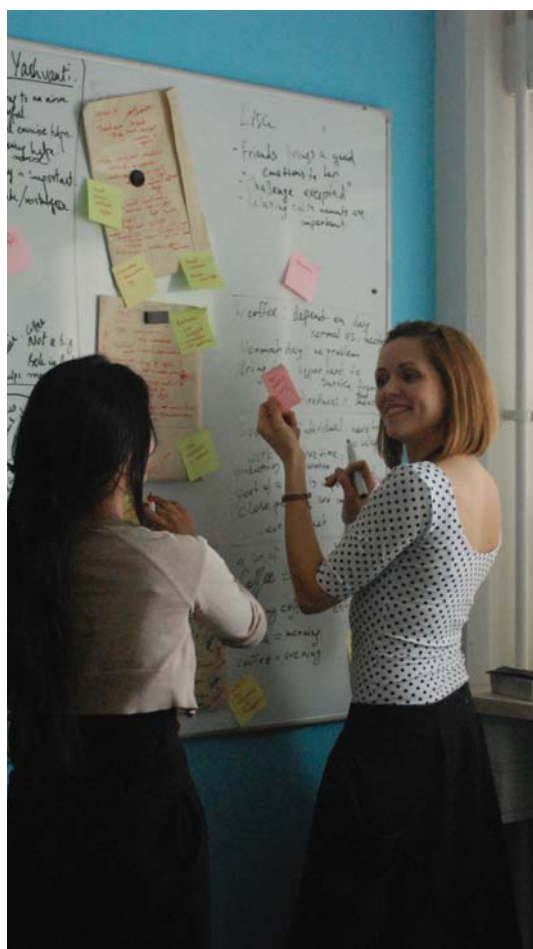


Figure 17: Different stages of analysis and interpretation of data during workshop with designers

5

RESULTS

This chapter summarizes the results of the experimental study that emerged during the workshop with the designers. The chapter presents the ratings of data in terms of insights gained by the designers. It also discusses the common themes related to coffee and happiness as well as the most recurring positive emotions evoked by the participants. In addition the chapter presents the results of the Application Test which helped in simulating the ideation process of that of a design team in a company where the data from the probes would be used to look for design opportunities.

5.1 Working with Probes

The effort put in designing the probes was rewarded by the participants' dedication to work on the probes. In total, 24 participants were involved in this study. Out of these, 20 participants performed all the tasks, 2 participants returned incomplete tasks and 2 participants opted out of the study due to other commitments. Overall the participants were enthusiastic about the probes. Participants answered all the questions in the question cards task and appreciated the illustrations on the cards very interesting. Most of the participants performed the "About your day" task daily on 5 consecutive days while few worked on it over the period of 2 weeks. Some participants said that they enjoyed working on this task the most. Here they shared a lot of detailed information about their lives and their emotions. One participant commented "I had nice experience to express myself, thanks for this opportunity!" This participant was very excited about the probe kit and even put extra efforts to print the pictures and make a collage out of it. Her diary was full of interesting text, photo cutouts and sketches.

It was seen that almost all of the participants did not carry the photo tags with them all the time and thought that they were a bit tedious to use. Instead, they chose to take the pictures without the tags and name (or number) the pictures with descriptive titles while the returning the probes. This however did not hamper either the motivation of the participants or the quality of the data they produced. Overall more than 200 pictures were collected from the participants. The drawing tasks felt like a challenge to the participants who were skeptical about their drawing skills at first. When they were assured that as long as the sketches convey their thoughts they can be very simple and minimalistic, the participants felt at ease to perform these tasks. It was evident from the results that the participants were very creative in all the tasks. They took every opportunity to write, draw, sketch and express their thoughts in the best possible way.

Figure 18: Interesting doodles by participants

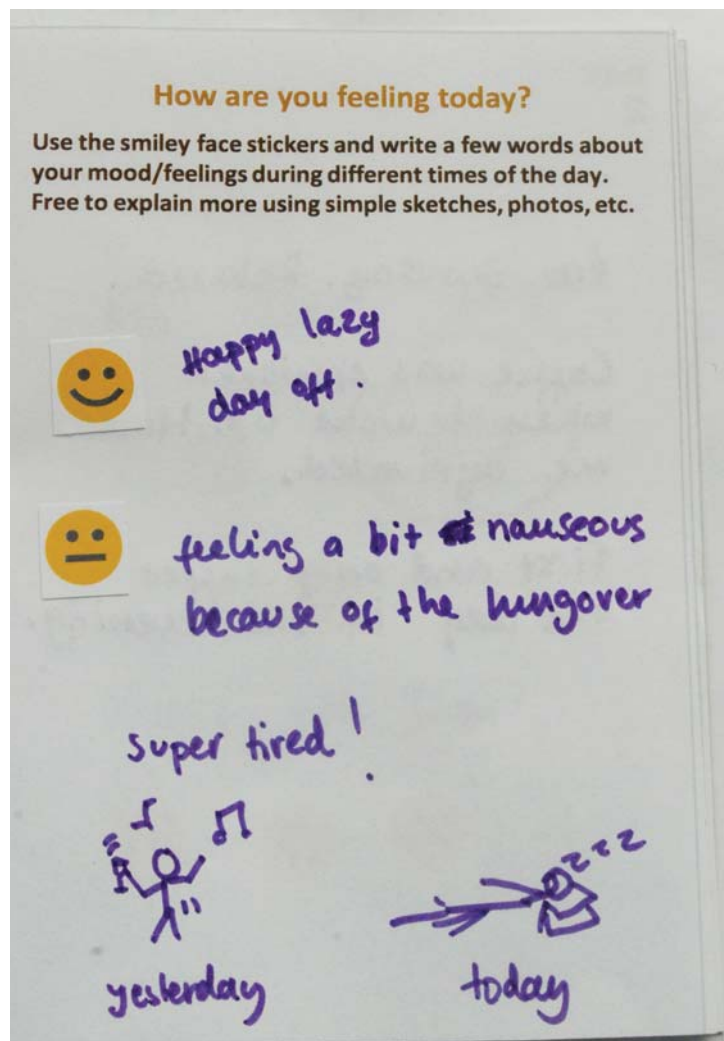
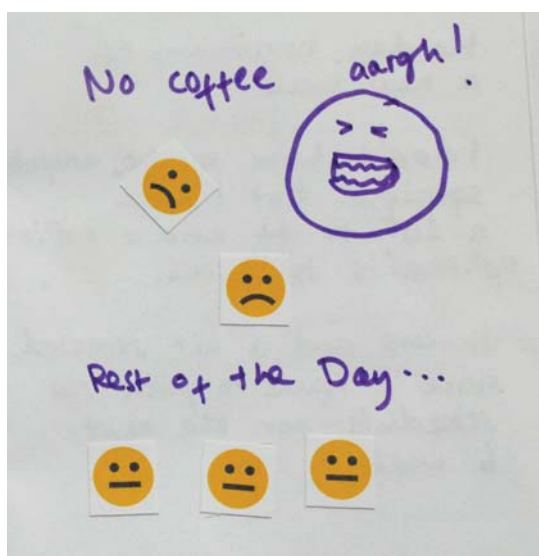
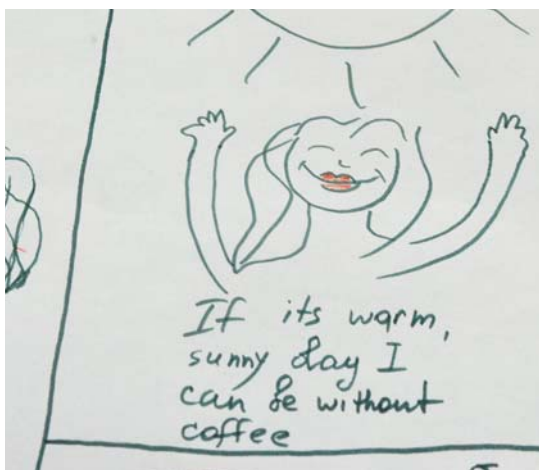




Figure 19: Photo collage by an enthusiastic participant





Figure 20: Photos and description sheets ready for interpretation



Figure 21: Participants taking photos about different activities during their day

5.2 Evaluating Insights for designers

After interpreting the probes, all four designers (including the author) were asked to evaluate the insights they received from the data obtained from the probing process. Each designer individually rated the insights (discussed in Section 3.3) that they felt would be relevant in designing products or services that would embody happiness. Figure 22 shows how the designers evaluated the relevance of the data obtained from the probes in terms of different insights.

<i>Insight</i>		<i>Designer 1</i>	<i>Designer 2</i>	<i>Designer 3</i>	<i>Designer 4</i>
<i>Inspiration</i>	The results from the probes can be used by the researchers or designers as a source of inspiration for future design.	High	Medium	Medium	High
<i>Empathy</i>	The data generated from probing techniques provides a comprehensive understanding of the user needs.	High	Medium	High	High
<i>Exploration</i>	The data derived from design probes can be utilized for identifying emerging themes	High	Medium	High	High
<i>Direct Data</i>	Direct data is helpful to answer the typical where, what, when, who and how questions related to the design	High	High	High	High
<i>Framework</i>	Data helpful in creating frameworks for understanding different elements of user experience, the significance of these experiences, the methods that can be employed to address them and so on	Low	Low	Low	Low

Figure 22: Relevance of insights evaluated by designers

5.2 Findings: Common themes:

While discussing about the different factors that brought happiness to the users, the designers started to identify different recurring themes and patterns that emerged from the data. At first the designers looked at the different contexts that bring happiness to the participants. For example the most common experiences of happiness were related to the participants' family and friends. The participants expressed their love for their family and friends and associated happy memories with them. Some participants talked about the satisfaction and joy they get by completing their work, while others talked about the joy of travelling and their fascination for new adventures. Most of them enjoyed the feeling of being in nature, walking through the woods, strolling on a beach and so on. After determining such recurring themes in terms of different aspects that brought happiness to the participants, the designers looked at instances where the participants associated their happiness directly with coffee.



Figure 23: Participant expressing happiness as drinking coffee with her family

Similar instances like these, that coincided with the recurring themes determined by the designers and directly associated the participants' happiness to coffee helped in determining the following most relevant themes for this study.

SOCIAL CONNECTION: A theme occurring across all the participants was a coffee as a medium for social connection. Two participants specifically mentioned that coffee is an important part of their family gatherings and is almost a tradition that has been followed throughout several generations. One of them said *"I learned to drink coffee from my grandma and I drink it with my parents. It's a family thing!"* Another participant mentioned- *"I usually don't drink coffee alone. So 'let's meet for a coffee' thing, is something I really like."* Thus, participants identified a coffee as an essential channel to be with friends, family and colleagues.

COMPLETE EXPERIENCE: Many participants related to coffee as an experience which comprises of the taste, brand, environment, social setting and so on. One participant said *"Hazelnut in coffee is the only way I drink sugar"* and mentioned that he takes pride in his affinity towards the Starbucks brand. To some participants this experience also means trying out new flavors, new cafes in entirely different settings which in a way becomes a part of their "new adventure". For instance one of the participants talked about the joy he gets in the process of making coffee - *"Happiness is roasting my own Uganda coffee beans"*.

RELAXATION: *"Coffee is a pause from life."* Some participants think of coffee as a relaxation drink, that they can enjoy alone or in the company of a good book. Especially the participants who consider themselves introvert think of coffee as a companion with whom they can sit back and reflect upon various issues.

TRAVEL EXPERIENCE: Participants who travel on a regular basis consider coffee as one of the means to connect with the new city. Some participants mentioned that whenever they travel they make it a point to taste the local coffee and include to their entire experience of travelling to a new place. *“Trip in Turkey. Had some Turkish tea and coffee.”*

“We are in Pisa. Our apartment has an amazing coffee machine. So life is good!”

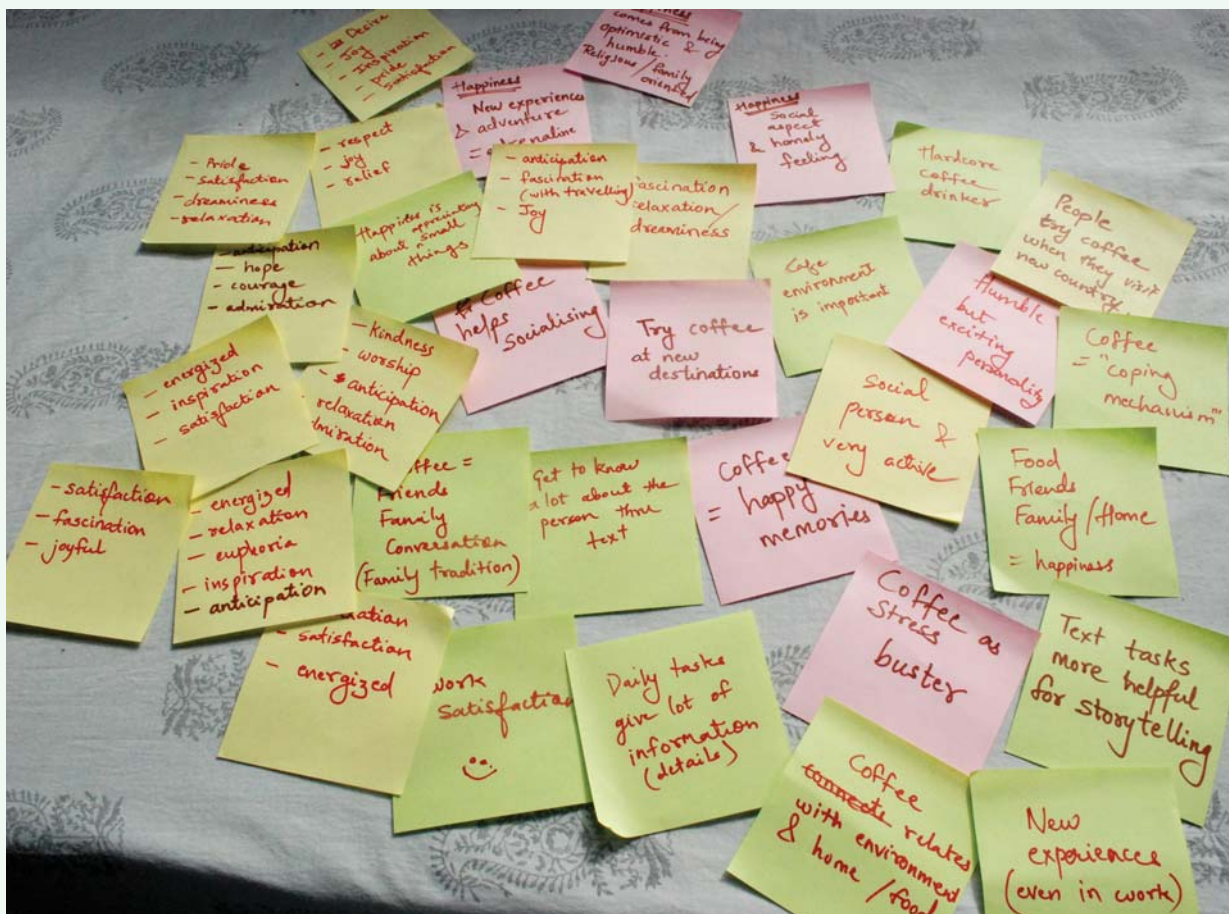


Figure 24: Different emotions and themes found during the analysis

5.3 Findings: Common positive emotions

Based on the 25 positive emotions discussed by Desmet (2012), the designers identified at least 3 positive emotions that were evoked through each participant's data. After discussing these emotions within the teams, they determined the most recurring positive emotions that represented the focus group. These emotions were the result of the designers' interpretation of different stories, experiences and thoughts from the participants. For example, one of the participants often expressed that he was proud of his work and that the completion of his work gave him a sense of satisfaction and joy. Another participant talked about his interest in travelling to different countries and how the exploration of these new places fascinated him. Instances like these helped the designers in finding the different positive emotions that were being conveyed or implied by the participant. The designers combined the different fragmented sources of data and interpreted them based on their own experiences and skills.

Following is a list of the most recurring positive emotions that emerged from the data from the probing process.

LOVE: To experience an urge to be affectionate and care for someone

DREAMINESS: To enjoy a calm state of introspection and thoughtfulness

DESIRE: To experience a strong attraction to enjoy or own something

WORSHIP: To experience an urge to idolize, honor, and be devoted to someone

EUPHORIA: To be carried away by an overwhelming experience of intense joy

JOY: To be pleased about (or taking pleasure in) something or some desirable event

HOPE: To experience the belief that something good or wished for can possibly happen

ANTICIPATION: To eagerly await an anticipated desirable event that is expected to happen

ENERGIZED: to enjoy a high-spirited state of being energized or vitalized

PRIDE: To experience an enjoyable sense of self-worth or achievement

FASCINATION: To experience an urge to explore, investigate, or to understand something

RELAXATION: To enjoy the recent removal of stress or discomfort

SATISFACTION: To enjoy the recent fulfillment of a need or desire

5.4 Application Test: From Probes for Happiness to Happy Concepts

Process

Once the designers had evaluated the most common themes and positive emotions prevalent in the focus group, they were invited for a quick brainstorming and ideation session. This exercise helped in simulating the ideation process of that of a design team in a company where the data from the probes would be used to look for design opportunities. This would help in understanding if the data found was relevant and can be actually be put into practice. Due to the time constraints of the designers, the ideation session was limited to 40-45 minutes. The aim of this exercise was not to come up with a detailed final concept or solutions but to check if the designers can come up with some possibilities that would lead them to certain solution areas. During the session, the designers looked at different combination of the emotions and themes to get inspirations for their ideas. The process followed by the team included a brainstorming session for 15 minutes followed by grouping the ideas and short listing them in the next 10 minutes. In the end, ideas were further narrowed down and detailed in the next 15 minutes to create rough concepts and highlight the possible solution areas.

After the ideation session, 5 of the participants who were involved in the experimental study were approached to check if the concepts from the ideation workshop were able to elicit any positive emotions from them. The participants were asked to give their feedback and comment on the how they felt about concepts. The participants were informed that the concepts were not completely developed and were just the direction in which the designers were thinking.

Concepts

Some of the concepts that were discussed during this brainstorming session and the comments received from the participants are as follows. It can be seen from the feedback and comments from the participants about the concepts generated from using the Probes for Happiness were able to evoke certain positive emotions in the participants like joy, fascination, *excitement and so on*.

1 PORTABLE OPTIONS FOR COFFEE

LOVERS: Travel coffee makers so that the coffee lovers can enjoy their cup of coffee on-the-go. This was particularly for those users who travel to different destinations for work or leisure and want to make and drink the early morning cup of coffee just the way they like.

"It would definitely make me a happier person to wake up next to my travel coffee maker when I go out for business trips. I would know what to expect and won't have to rely on the bad tasting coffee in the hotels."

2 SEND A COFFEE: Express your love to your friends, family by gifting them their favorite coffee. A concept which allows you to send a cup of coffee to anyone via social media. This can be done by connecting your social media account with a membership card for a certain brand (or brands) of coffee. When you "Send a coffee" to someone the receiver gets a coffee gift card for their favorite brand of coffee.

"I like the idea of sending coffee over social media. It could be interesting to ask someone out for a coffee date via social media! Sounds both risky and exciting!"

"I have so many good memories with my friend while sipping coffee at Starbucks in NY. Now I am back to Finland and I would love to send her a coffee like this to rejuvenate the feelings! Will make us both nostalgic and happy!"

3 SERVICE OF SOURCING COFFEE FROM DIFFERENT COUNTRIES:

The sourced coffee or beans could be from a network of coffee producers around the world. Different tastes/flavors of coffee will give a break out of the routine, while giving them a joyous and happy feeling. This kind of a concept will provide opportunities for the user to share memories of travel experiences with friends and family and make social connections over a coffee. The fair trade sourcing and delivery service will ensure user's respect for nature.

"I would be excited to register to such a service! It would be really interesting to see what surprise is in store for me every time they deliver a different flavor of coffee."

"I think I would like to try the coffee service option. I love to talk about my travel experiences and a new coffee flavor would be a great conversation starter each time!"

6

ANALYSIS

This chapter presents the qualitative analysis of the results of the experimental study and the design simulation workshop. The chapter explores the research questions by analyzing the data from the probing process for :

- 1. User insights like Inspiration, Exploration, Empathy, Direct Data and Framework: These insights help in addressing if the probes for happiness produced design relevant data for understanding happiness of the participants.*
- 2. Nature, scope and medium of data: These elements help in addressing the grounds to defining the guidelines for designing probes for happiness*

6.1 Exploring Research Question 1

How can design probes help in capturing happiness related data from the users? Does this probing process generate enough design-relevant data that can be utilized for ideation or concept development of products or services that are aimed towards bringing happiness to the users?

After analyzing the data from the probes and evaluating their relevance for developing products that embody happiness the following analysis was drawn to explore the potential of design probes for happiness. The results in sections 4.1, 4.3 and 4.4 show that the design probes can be used a tool to understand different aspects happiness in users. It shows that the probes can potentially point towards the most recurring themes and positive emotions for a certain focus group. In addition, the results in section 4.2 indicates that probes for happiness can help in developing design relevant information for the designers as follows.

INSPIRATION: The results from the user study indicate that the data derived from probes for happiness can be used by the designers as a foundation of inspiration for design. However, the designers felt that the data can be enriched with the help of in-depth interviews of the users. Since, the data attained from the probing process was open to interpretation, it served as an inspiration for the designers to dive into related topics and themes. This triggered their imagination and allowed them to combine the fragmented data sources to form new sources of inspiration.

EMPATHY: The data collected by the probes for happiness was filled with personal stories, experiential details and authentic situations. The probing process was successful in highlighting some of the most intimate and personal details about the participants' happiness such as dreams, aspirations, relationships, concerns and so on. The designers could easily relate to the visual and narrative material from the probes in order to form a comprehensive understanding of their needs. This empathic data derived from probes for happiness proved relevant to the designers for understanding the motivations of the participants, building the personas and case scenarios.

EXPLORATION: The data derived from probes for happiness was helpful in identifying current and emerging themes. It was interesting to see that the data lead to exploration of themes on different levels like emotions, experiences, cultures, markets, products and so on. Thus the probing process was helpful in generating tangible and intangible themes. Although these themes surfaced from the preliminary understanding of the data, it provided the designers with an initial design scope. The designers pointed out that these preliminary themes can serve as primary focus points for in-depth interviews in further stages of the design process. This could help in building upon these preliminary themes while simultaneously exploring more opportunities and challenges centered on other themes.

DIRECT DATA: In terms of getting direct and quantitative data from the users, the probes for happiness were able to answer some of the straight forward where, what, when, who and how questions that were later useful in making design related decisions. The data was used in developing a statistical analysis of the participants which helped in ranking the themes and making conclusive choices at the early phases of design. The direct data thus proved to be one of the most important factors to rationalize the design decisions derived from the open subjective data.

FRAMEWORK: While creating the frameworks for understanding the different elements of user experience, the designers concluded that the data from the probes was insufficient and should be complemented with interviews and other ethnographic techniques. Since happiness is a combination of variety of positive emotions and experiences, creating a single framework that could include all the aspects of happiness was a challenge. More in-depth data and thorough analysis of the different elements of happiness over the period of 2-3 day long workshop would have helped in creating a good framework to support the design process.

6.2 Exploring Research Question 2

What are the essential elements that should be considered while designing probes that are specifically targeted towards capturing happiness related data during a user study?

The dimension matrix in section 4.2 consists of elements that define the nature, scope and medium of data obtained from the probes for happiness. Thus, evaluating the results obtained from the probing process on the basis of the dimension matrix will help in understanding elements that helped in obtaining design relevant data. These elements will later be utilized to develop the guidelines for designing probes for happiness.

NATURE OF DATA: PERSONAL VS CONTEXTUAL

The probes for happiness were a good tool for expressing and communicating personal data. The participants were able to find it easy to tell their stories using the probes and the designers found them helpful to understand the daily lives of the participants. The data obtained from the probes was sufficient and relevant to form basic themes related to the personalities of the focus group. The success of probes directed towards gaining personal information depends on the motivation of the participants and their willingness to share their information. Especially since happiness is a very personal experience, some extra efforts must be concentrated not just to motivate the participants to share the true experiences but also to assure them about the confidentiality of the data. While communicating the different contexts of their lives, the participants found the photo tasks most helpful. The probes allowed them to express the different elements of their life and the factors affecting their happiness in various visual and narrative form. However the designers felt that the data had to be complemented with detailed interviews and even observation and shadowing techniques in order to draw relevant interpretations. The contextual data was helpful in opening up lot of avenues and interpretations for the designers. However while dealing with contexts, it becomes difficult to assess if the design solution will directly relate to the participant's happiness.

SCOPE OF DATA: OPEN VS SPECIFIC TO COFFEE

The probes for happiness helped in deriving considerable amount of open data like routines, needs, preferences and emotions related to the participants in different contexts of their daily life. The diary and photo tasks proved to be the most helpful tools in getting information about the needs, emotions, daily routines, habits and choices of the participants. It helped the designers in deriving the overall picture about the different aspects of the participant's life in terms of work, family, friends, leisure activities, likes, dislikes and so on. These details were particularly helpful in building basic personas of the participants and understanding the overall nature of focus group. It was found that the open questions gave broad range of data which was subject to interpretation and needed more detailed analysis. The probes for happiness were useful in gathering data related to the coffee habits of the participants. However it was seen that the participants answered the questions specific to coffee with short and to-the-point answers. This resulted in data that had some limitations in terms of inspiration and the designers had to spend more time on deriving the interpretations. It was concluded that the tasks should have been designed to trigger more subjective and detailed responses when it came to questions specific to coffee.

MEDIUM OF DATA: VISUAL VS TEXTUAL

The visual tasks generated a wide range of data in terms of the daily lives of the participants, their happiness and their habits related to coffee. However, the visual tasks had to be supported with textual information to make complete sense of the data. Even though the textual descriptions were optional in visual tasks, all the participants felt the need to write a few words about the visuals in order to express the context of the visuals. Initially, when the probes were designed, it was assumed that the participants might consider the writing tasks tedious and less interesting. However it appeared that most of the participants performed the writing tasks really well. They employed considerable amount of time in mentioning the details of their lives through the textual tasks. It was noticeable from the data that while the happy emotions could be easily identified with pictures and short descriptions, when it came to the unhappy emotions, the participants took time to write them down in detail and reflect upon them.

The data gathered from the six sets described in section 4.2.2 and the designers' response to the relevance of the data reflected that the sets with only visual or only textual tasks did not provide an overall picture of the participants. Instead, the sets with a combination of both visual and textual tasks resulted into more rich data which gave a better understanding of the different contexts of the data. Thus it was concluded that a balanced combination of visual and textual data gives the overall picture of the participant's state of mind, especially while dealing with data that is directed towards understanding emotional aspects of the participants.

7

CONCLUSIONS

This chapter brings together all the previous chapters which comprise this research project thesis. This is achieved through demonstrating how the research aim and objectives were met through literature review and experimental study and design simulation workshop. This chapter concludes the research work by answering to the research questions by

- 1. highlighting how the structured efforts in instilling positive emotions throughout the probing process for happiness helps in capturing happiness related information from the participants.*
- 2. presenting the guidelines for designing Probes for Happiness in terms of designing the materials of the probe kit and the content of the materials.*

In addition, the contribution to knowledge given by this research and recommendations for future work are discussed.

7.1 Meeting the Research Aim and Objectives

The aim of this research was to test the potential of design probes for capturing happiness related information from the user. Additionally, it was also aimed at designing the probes that can successfully capture these happiness related aspects from the users. This was achieved by merging the knowledge from the literature review and the findings and results of the structured experimental study.

The data interpretation and ideation workshops led to the identification and building of a set of guidelines that -

1. underline the important elements that should be considered while designing probes for capturing positive emotions in users.
2. provide further insight in improving the current probing techniques to more effectively deal with the positive emotions of users.

7.2 Answering the Research Questions

1. How can design probes help in capturing happiness related data from the users? Does this probing process generate enough design-relevant data that can be utilized for ideation or concept development of products or services that are aimed towards bringing happiness to the users?

Previous studies in literature, as discussed in the earlier sections, have shown that probes are useful in understanding the wide range of emotions, needs and desire of the participants. The research in this thesis has helped in realizing the focused use of the design probes specifically for finding positive emotions that lead to the happiness of the participants. Although the approach and the process of using the probes is similar in both cases, the structured efforts in instilling positive emotions throughout the probing process set the Probes for Happiness apart from the previous use of probes. The positive emotions evoked by the materials in the probe kit, the manner in which the kit is presented to the users, the content of the probe kits that allows the participants to reflect on the positive aspects of their life experiences all add up this focused application of Probes for Happiness.

Overall, the results and analysis of the user study leads to the conclusions that probes for happiness can be used as a tool for recording general overview about happiness related aspects of the users by allowing them to express their emotions through visual and textual mediums. They are helpful in finding preliminary themes related to the daily lives and emotions of the users. This information serves during early phase of concept design, where the goal is unclear and the challenge with the design team is to find the right questions to ask to the users. This approach also supports the early speculation about the scope of the emotions that the design framework will comprise of. Probes for happiness elicit and enrich the designers' inspiration while channeling their efforts towards inculcating these happiness related

aspects in the design process. However, it was seen that that the data could have been enriched with the help of detailed interviews with the participants to get in depth understanding of their emotions. It is often seen that participants cannot always express their emotions through text or visuals. In such scenarios it is advisable to complement the data derived from probes with techniques like observation, shadowing and so on. Thus it can be concluded that design probes can be utilized to gain the preliminary themes or overview of the participant's happiness, but they cannot be the stand alone tools for the purpose.

It must however be noted that since happiness is so subjective for the participants and can be interpreted in various ways by the designers; there is no definite amount of data that can represent the entirety of happiness experienced by the participants. The fragmented subjective data obtained from this probing for process for happiness is characterized with very broad focus and leaves space for personal interpretations of the designers. This ambiguity and openness for interpretation of the data might create uncertain conclusions and design decisions. Thus, output of the probing process for happiness might not generate the final ideas or concepts that can be readily implemented. Instead they direct towards the possible themes, opportunities and possibilities that the designers can explore while designing new ideas and concepts.

2. What are the essential elements that should be considered while designing probes that are specifically targeted towards capturing happiness related data during a user study?

The following elements comprise the guidelines for designing probes for happiness. These guidelines are based on the analysis of different elements considered while designing the probes for the experimental study for coffee case, the success of certain elements and the suggestion for improving the elements that did not produce relevant results.

The guidelines are divided into two sections: Materials and the content of the materials.

1 Materials:

This section provides guidelines that should be considered with respect to designing the physical and emotional aspects of the materials in the probe kit. These guidelines explain how the materials in the kit should be designed to provide a feeling of relaxation, ease of use, comfort and playfulness to the participants. In my opinion, when the participants feel positive about the materials in the probe kit, it stimulates their emotional responses and helps them in making the best possible use of the materials to express themselves.

CUSTOMIZE THE KIT:

The probe material should be designed and presented with great care so that it is appealing to the participants and gives a feeling that the probes were specially made for them. Probe kits should also be designed by taking into account the perspectives of participants and the aspects of their experience. Depending on the needs and comfort of the focus group the contents of the probe kits should be changed or replaced. For example, during the study, when one participant expressed discomfort in sharing pictures about her personal life, the pictures task in her probe kit was replaced by textual task that she felt more comfortable with.

PROVIDE VARIETY OF MEDIUMS TO EXPRESS HAPPINESS AND ITS CONTEXTS:

Most of the times, it is difficult for the participants to explain happiness and their contexts in mere words or pictures. Thus, the probe kits should be designed to allow the participants to use different mediums like text, photos, audio, sketches and so on to express their emotions. These different mediums should serve as tools for not only the documentation of the happy events but also for the reflection on the nature and context of the event.

INCLUDE PLAYFUL ELEMENTS:

Since the aim of the probes is to elicit happiness related thoughts in the participants, the probe material should include fun and playful elements that create a pleasant feeling about the material. For example, the probe kit in the above user study included different smiley face stickers to inspire the participants to make little humoristic or emotional messages. The illustrations in the tasks also introduced a playful element in the probes which made them more appealing to the participants.

MAKE THE PROBES ENJOYABLE FOR DESIGNERS/RESEARCHERS:

In addition to making the probe kits playful and appealing for the participants, they should be motivating and enjoyable for the designer or researcher who evaluates the material. The probes should be designed in a manner that they enable the designers to utilize the participant's subjective interpretations directly as source of inspiration. As discussed in above, including different playful elements and mediums for the participants for their sharing experiences can make the resulting data more interesting to read and evaluate. In addition, making the probe materials easy to scan, sort and document can make the probes more efficient to the researchers.

DO NOT CONSTRAINT THE USE OF PROBES:

The probes should offer creative freedom for the participants. It should be conveyed to the participants that the instructions in the kit are merely suggestions and they are free to use the materials creatively in whatever way they feel is comfortable to express their feelings. Doing this instills a relaxed feeling in the participants and helps them express their emotions freely and efficiently.

2 Content of the Materials:

This section covers the guidelines for designing the content of the materials, in other words the information that the materials in the probe kit should seek from the participants. These guidelines present the different dimensions of information that should be addressed by the materials in order to gain a holistic understanding of the participants.

BALANCE VISUAL AND TEXTUAL PROBES:

There should be a balanced combination of visual and textual elements in the probe kit to gain the overall understanding of the participant. It is evident from the user study that while the participants easily identified the happy emotions with pictures and short descriptions, when it came to expressing unhappy emotions, they used the textual medium to write about their emotions in detail and reflect upon them. Also, visual data supported with textual information and vice versa helps in making complete sense of the data. Thus the probe kit should be designed to include both visual and textual tasks in order to get inspirational as well as informational data from the participants. Once again the participants should be given an option to choose the medium they want to use to express their emotions in the best possible manner.

INCLUDE BOTH OPEN AND SPECIFIC QUESTIONS

The tasks in the package should allow collecting data such as experiences, feelings and memories as well as daily routines and actions of the participants. In order to get a holistic view about the participants' life, the probe kit should include open and (product or case) specific tasks. While the open tasks deal with the daily routines, habits, likes and dislikes of the participants, the product specific questions address their choices and experiences related to the product. These tasks can be further divided into general and happiness specific sections to understand about the happiness of the participants in general and that caused by specific product or situation.

ALLOW PERSONAL AND CONTEXTUAL RESPONSES:

Since happiness is very subjective and is dependent on both personal and contextual aspects, the probe kit should allow the participants to share the information about their personal life as well as about the external factors that affect them. Thus, probe material should be targeted towards gathering information related to the participants themselves, as well as towards understanding how different contexts or external aspects (like surroundings, people, places) affect the participants.

ASK SUBJECTIVE AND OBJECTIVE INFORMATION:

The probe tasks should seek for both subjective and objective information from the participants. At times while dealing with subjective topic like happiness, it becomes essential to rationalize it with objective information in order to create tangible interpretations. While subjective data can serve as a source of inspiration for the designers, the objective data can help in defining certain scope for design frameworks. Thus, it is important to ask for the objective data from the participants which can be used to support the rich qualitative analysis of their subjective information.

DESIGN UNBIASED PROBES: In user research, information bias undermines the validity of results (Grimes and Schulz, 2002). Thus, the probe material should be designed in a way that they do not allow any bias. Although the probes for happiness should address or elicit happiness related thoughts in the participants, care must be taken to ensure that the material leaves room for expressing unhappy emotions as well. For example, the material can include positive emotion keywords like happiness, love and so on to evoke the feeling of happiness in the participants, but the task itself can allow the participants to reflect on the unpleasant feelings as well. This helps in gaining unbiased information about the happiness aspects of the participants while understanding what impacts their feelings in a negative way.

7.3 Contribution to Knowledge

This thesis establishes a strong association between the users' happiness and its impact on design of products and services. It proposes a potential and novel application of design probes to strengthen the correlation between happiness and design. The process of probing allows for interpretation of thoughts, opinions and dreams which resonates well with the subjective nature of happiness. Thus, the approach of probes for happiness is an important contribution to the knowledge in the field of happiness and design. The guidelines for designing probes for happiness developed in this research have provided an initial basis for gaining design relevant information about happiness aspects of the users. The research also has shed significant light on key insights gained by the designers from such probing process. Certainly more research at the theoretical and practical level is needed but this research has laid the first stepping stones to further develop and understand research in this field. In addition to this, certain aspects of the methodology used to carry this research have also contributed to knowledge in a novel way. For example, the Dimension Matrix represents the complex overlapping and relationship of the different elements required in gaining holistic information about the user. It is an important contribution to knowledge in terms of design and development of probes and has wide potential for practical applications.

7.4 Future Work

This research is just the beginning of exploring the potential application of probes and it leaves an array of opportunities for new research avenues and perspectives. In order to develop and improve the probes for happiness the following suggestions are made. Due to time constraints, this thesis presents the evaluation of the suggested probes for happiness approach with only one focus product. Future work could involve evaluating the probes for happiness in different cases like technology or health related products and services. This can help in assessing whether the suggested design guidelines can help in gathering relevant happiness-related data for designers in different contexts and fields of study. In addition if the design guidelines should be made available to experts and practitioners in this field for open discussions and include their opinions based on their experience. This can help in collecting practical as well as theoretical insights on the overall approach and shed light on the new aspects that can improve the process. Further research can also include exploring the possibility of introducing elements from Make tools and Design Games to enrich the probing process through a series of comparative studies and experiments. Since, all these techniques focus towards understanding the human phenomena, it would be interesting to study how the combination of these techniques can be brought together to specifically gather information about the user's happiness.

These suggestions could yield new improvements leading to the best way of learning about happiness of users in different contexts and using this information to create tangible concepts that make the users happy.



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